ANNUAL REPORT

2024-2025



Indian Centre for Space Physics

INDIAN CENTRE FOR SPACE PHYSICS
ANNUAL REPORT
(2024-2025)

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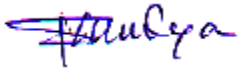
YouTube:https://www.youtube.com/@indiancentreforspacephysic4751/videos

Report of the Governing Body

Governing Body is pleased with the overall progress of ICSP, now that it has fully shifted to the new campus. It has also approved the construction work at the balloon facility at Chandrapur, Birbhum. It notes that the funding was approved in early 2020 and approval to use it was made almost 5 years after that. It hopes that the infra-structure can be made as per original plan.

The Governing Body Members appreciate the initiatives to encourage youths to take PhD and pre-PhD courses and the Certificate/Diploma courses at the Centre. It is indeed very satisfying to see that a large number of students are registering for the courses. The members congratulate the faculties for carrying out many research activities of superb quality and publishing them in peer-reviewed Journals and for supervising quite a large number of PhD students, interns and pre-PhD students. They also appreciate the efforts of the faculty members to take great care of the museum and the observatory visitors, especially when large groups come.

At the Silver Jubilee celebration, the Governing Body members remembered the care and the hard work that the Founder Governing Body members put together to make a little sapling of 1999 to a gigantic tree of today.



Prof. Subrata Midya
Vice-President

From the Director's Desk

I am very pleased to report that to steadily supply eligible and well trained students to our most successful PhD program, we have taken a large number of measures. We have introduced (a) Pre-PhD courses and (b) Certificate/diploma courses. Our museum of Astronomy and Space Science is attracting many students who are inspired to carry out higher educations in these subjects. We are reviving our successful program named "Districtwise Space Science Symposia" at the school level. In the past, many students who participated in these symposium later chose to carry out PhD program with us. In terms of academic output, ICSP has published several research papers in all the Departments. In fact, the number of papers per faculty per year is found to be comparable or better than any other specialized institutes elsewhere in India. Similar statistics is applicable to PhD supervision rate per faculty per year. I congratulate the hard working faculties of the Centre to make this possible.

In terms of public outreach program, we are organizing Telescope making workshop at IERCOO, Sitapur in a big way. The construction activities of the ICSP Stratospheric Balloon Facility (ISBF) at Chandrapur (Birbhum) has started after the foundation ceremony in November, 2024. A maiden flight from the ISBF facility was launched and many foreign experts attended the meeting We also organized Conferences on low-cost balloon program, TCAF modeling, Data analysis in Optical Astronomy and Ionospheric research.

On 7th of December, 2024, ICSP completed its twenty five years of relentless service to the scientific community. The Foundation day was celebrated with various academic and cultural programs, quiz competitions etc. The chief guest in the closing ceremony was Swami Suparnanandaji Maharaj, Institute of Culture, Golpark. On this occasion, all the staff members were given a memento.

To commemorate the Silver Jubilee year, we published a Coffee Table book "Looking Back" which narrates the pictorial history of ICSP since inception.



Sandip K. Chakrabarti
Director

Governing Body (GB) of the Centre

Prof. S.K. Midya, Vice President
Dr. Sonali Chakrabarti, Secretary
Mr. Sujay Maiti, Treasurer
Mr. G. Banerjee, Member
Prof. A. R. Rao, Member
Dr. S. C. Chakravarty, Member
Gr. Capt. Krishnendu Kundu, Member
Prof. Sandip K. Chakrabarti, Member

Members of the Research Advisory Council (RAC)

Prof. S. K. Midya, Calcutta University (Chairman)
Prof. A. R. Rao, Ex-Tata Institute of Fundamental Research, Mumbai
Prof. S. K. Chakrabarti, ICSP
Prof. D. J. Saikia, Ex-National Centre for Radio Astrophysics, Pune
Prof. N. M. Ashok, Ex-PRL, Member
Prof. R. Gupta, Ex-IUCAA, Member

Director

Prof. Sandip K. Chakrabarti (Tel. : +91 9903120700
Email: sandip@csp.res.in / sandipchakrabarti9@gmail.com)

Finance Officer (Acting)

Mr. Rajkumar Maiti (Email: rajkumar@csp.res.in / rajkumarmaiti24@gmail.com)

Public Information Officer

Mr. Rajkumar Maiti (Email: rajkumar@csp.res.in / rajkumarmaiti24@gmail.com)

Honorary Faculty Members

Dr. B. B. Bhattacharyya, Ex-ISM, Dhanbad	Distinguished Professor
Dr. Shalivahan, IIT Dhanbad	Professor
Dr. S. Sharma Ex-SNBNCBS	Professor
Dr. S. Chakrabarti, M. M. Chandra College	Professor
Dr. S. C. Chakravarty, EX-ISRO	Senior Professor
Dr. A. K. Chatterjee, Malda College	Scientist
Dr. R. Chattopadhyay, Haripal Institution	Scientist
Dr. T. K. Das, Narasimha Dutta College	Assoc. Professor
Dr. P. K. Jana, Panipukur B.Ed. College	Scientist
Dr. M. M. Majumdar, DPI	Scientist
Prof. S. K. Midya, Ex-Calcutta University	Professor
Dr. G. Tarafdar, Barasat Govt. College	Scientist
Dr. B. G. Dutta, R.B.C. College	Scientist
Dr. S. K. Mondal, S-K-B University	Scientist
Dr. H. Ghosh, Heritage Institute of Tech.	Scientist
Dr. K. Giri, NITTTR, Kolkata	Scientist
Dr. S. Ray, G.H. College	Scientist
Dr. S. Pal, Medinipur City College	Scientist
Dr. A. K. Choudhury	Scientist

Faculty Members

Prof. Sandip K. Chakrabarti, Director and Distinguished Professor
Dr. Sourav Palit, Assistant Professor-II
Dr. Ashish Raj, Assistant Professor-II
Dr. Tamal Basak, Assistant Professor-II
Dr. Devendra Bisht, Assistant Professor-I
Dr. Prantik Nandi, Scientist-C
Dr. Sovan Saha, Scientist-C
Mr. Sudipta Paik, Scientist-A

Research Fellows/Scientists

Mr. Sujoy Kumar Nath (SVMS)
Mr. Washimul Bari (Malda Branch)
Mr. Abhrajit Bhattacharjee (ICSP)
Mr. Sayak Chakraborty (INSPIRE)
Mr. Kuldeep Belwal (ICSP)
Ms.Shraddha Biswas (ICSP)
Mr. Mohit Bisht (ICSP)
Mr. Subhajit Bhattacharyya
Mr. Rupnath Sikdar (ICSP)

Engineers

Mr. Debashish Bhowmick, Engineer -II and Estate Officer

Laboratory Staff

Mr. Hriday Roy	Laboratory Assistant

Office Staff

Mr. Rajkumar Maiti	Executive Officer (Admin)
Mr. Jyotishman Maitra	Computer Assistant
Mr. Uttam Sardar	Office Helper

Security and contractual Staff

Mr. Barun Chakraborty
Mr. Rehanul Haque (till 4/24)
Mr. Binod Singh
Mr. Bivash Bhandari
Mr. Joydeb Shee
Mr. Raghu Nath Pal
Mr. Santosh Das
Mr. Kamala Kanta Midya

Out of Station Facilities:

IERCOO at Sitapur, West Medinipur:

The Ionospheric and Earthquake Research Centre (IERC) and Optical Observatory (IERCOO) has facilities for studying VLF, radio and optical astronomy. It has adequate computing and internet facilities, VLF antennas and receivers. Its major telescopes are 0.25m Meade Optical Telescope and a 0.61m Plainwave reflecting telescope. Solar power for electricity keeps this remote Centre running round the clock. The guest house Dhruva for 36 students/visitors was inaugurated by Prof. Subrata Midya, Vice President of the Governing Body. With this facility IERCOO can now have as many as 60 visitors at a time and therefore hold small conferences on campus at Sitapur. It has two seminar rooms.

This first facility is used only during balloon flights twice per year for a period of about two months. It has all the facilities to launch balloons and retrieve payloads. A 2 Acre land has been acquired to create a permanent ICSP Stratospheric Balloon facility at Chandrapur, close to Suri. The construction work of the laboratory/guest house etc. has started.



Foundation stone laying ceremony at ICSP Stratospheric Balloon Facility, Chandrapur

Malda branch at English Bazar:

Two office rooms at Atul Market and the terrace are regularly used by the members of the Malda branch. It has computing and internet facilities and a small library. It has VLF antennas to receive VLF signals from transmitters all over the world.

Brief Profiles of the Scientists of the Centre



Dr. Achintya K. Chatterjee: He is an Associate Professor and Ex. Head, Physics Department, Malda College and an honorary scientist of ICSP. He is currently doing data analysis RXTE satellite and observing SID by VLF antenna. He is also the President of the Malda Branch of ICSP.



Dr. Asit Kumar Choudhury: He was an Asst. Teacher at the L.M.S.M. Institution, Malda. He is working on data analysis of RXTE satellite and also observing SID using VLF. He is also the Secretary of the Malda branch of ICSP.



Dr. Ashish Raj: He is an Assistant Professor – II. He works on the spectrophotometric study of Transient Sources (Novae/supernovae), AGNs and FS CMa stars.



Mr. Abhrajit Bhattacharjee: He is Senior Research Scientist of the Centre. He is working on the effects of Kerr spin parameter on the spectra of accretion disks around black holes.



Prof. Bimalendu B. Bhattacharyya: He is the Ex-President of the Governing Body and an Honorary Emeritus Professor. He is currently serving as the Chairman of the Science Advisory Council of NGRI, Hyderabad. He was the Director of Indian School of Mines, Dhanbad. His field of specialization is the study of deep crustal structure on earth from magneto-telluric data.



Dr. Broja G. Dutta: He is an Assistant Professor at R.B.C. College, North 24 Paraganas and has completed his Ph.D. as a “Teacher Fellow” at ICSP under Faculty Improvement Programme” of UGC. He is working on the time- lag properties of X-ray emission from accretion disks around black holes. He is an honorary Scientist of ICSP.



Mr. Debashis Bhowmick: He is an Engineer-II at ICSP and is the laboratory in Charge which oversees the activities related to VLF antennas, X-ray detector fabrication, test and evaluation and balloon experiments. He is also the Estate Officer of ICSP and looks after the maintenance of the three campuses.



Dr. Devendra Bisht: He is a Assistant Prof-I, He works on the study of star clusters, the identification of variable stars, and the study of exoplanets.



Dr. G. Tarafdar: He is an honorary scientist of the Centre. He is a faculty at Barasat Govt. College.



Dr. H. Ghosh: He is an Honorary Scientist at ICSP. He is an Assistant Professor at Avedananda Mahavidyalaya. He works on Monte Carlo simulation of Radiative transfer around black holes.



Dr. K. Giri: He is an honorary visiting faculty at ICSP. He is an Assistant Professor at NITTTR, Kolkata. He works on numerical simulations of accretion flow around black holes, Artificial Intelligence, Machine Learning etc.



Mr. Kuldeep Belwal : He is a Junior Research Scientist. He works on multi-wavelength studies of open clusters and searches for variable stars.



Dr. M. M. Majumdar: He is an honorary scientist of ICSP. He is working on similarities of accretion flows around black holes and fluid dynamics in a converging-diverging duct.



Mr. Mohit Singh Bisht : He is a Junior Research Scientist. He works on the Spectrophotometric Study of Novae.



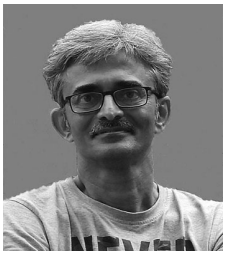
Dr. P. K. Jana: He is an honorary Scientist of ICSP. He is an Associate Professor of the Government Training College, Hooghly. He works on trends of Ozone depletion over India.



Dr. Prantik Nandi: He is a Scientist – C. He works on changing look active galaxies.



Dr. R. Chattopadhyay: He is an honorary scientist of ICSP. He is an Asst. Teacher at Haripal G. D. Institution. His research work includes Airglow and Ozone depletion.



Mr. Rana. Khan: He is a retired Asst. Teacher of Bidhan Nagar Govt. High School and is involved in activities of ICSP observatories. He is in charge of the training using IERCOO Optical Telescopes.



Prof. S. K. Midya: He is a Professor and Ex-Co-ordinator of the Dept. of Atmospheric Science of Calcutta University and an honorary Professor of ICSP. He works on Airglow experiments, Ozone depletion problem and Earthquakes.



Dr. Sabyasachi Pal: He is an Honorary Scientist at ICSP. He is working at the Medinipur City College His research is on the transient radio sources and multi-wavelength study of known transient events. He is doing a galactic plane survey, main goal of which is to search for new supernova remnants.



Prof. Sandip K. Chakrabarti: He is the founding Secretary of ICSP and currently the Director of ICSP. His research interests range from physics of black hole accretion and outflows; high energy astrophysics; instrumentation for X-ray/gamma-ray observations and low cost balloon borne studies; ionospheric perturbations due to terrestrial and extra-terrestrial phenomena and their effects on VLF radio waves and Chemical Evolution of star forming regions.



Dr. Sonali Chakrabarti: She is an Associate Professor at the Maharaja Manindra Chandra College and an honorary Professor of the ICSP. She is a founding member of ICSP and presently the Secretary of the Governing body. Her research interest lies in the formation of bio-molecules in space, VLF research and study of the possibility to produce high resolution millimeter and microwave grating instruments.



Mr. Sujoy Kumar Nath: He is a Swami Vivekananda Merit Cum Means Scholarship (SVMCM) holder and is working on spectral and timing analysis of some stellar-massive black holes.



Dr. Suman Ray: He is a Teacher at Gobordanga Hindu College and is working as an honorary scientist of ICSP. He is in the VLF group and is working on the earthquake related anomalies of VLF signals.



Dr. Sushanta K. Mondal: He is an honorary scientist of ICSP and an Assistant Professor at S.K.B. University, Purulia. He works on the effects of high energy radiation in ionosphere and their detection through VLF radio signal strength.



Dr. Sourav Palit: He is an Assistant Prof.-II of ICSP and works on Geant4 modeling of instruments, Earth's upper atmosphere, balloon borne experiments etc.
He is a convener of the Public outreach program of ICSP.



Mr. Sayak Chakraborty: He is an INSPIRE Senior Research Fellow. He works on the numerical modeling of solar radiation induced lower ionospheric turmoils.



Mr. Subhajit Bhattacharyya: He is working as a Junior research fellow doing VLF and ionospheric science. He is working under the supervision of Dr. Sourav Palit and Prof. S.K. Chakrabarti.



Ms. Shraddha Biswas : She is a Junior Research Scientist. She works on optical Astronomy under the supervision of Dr. Devendra Bisht.



Dr. T. K. Das: He is an honorary Associate Professor of ICSP. His work is on the solar physics, especially on sunspots and classification of radio bursts. He also works on the geo-spot model of earthquakes, relationships between earthquakes and VLF etc.



Dr Tamal Basak: He is an Assistant Professor-II. He works on the numerical modeling of the ionospheric perturbations in presence of solar and other terrestrial energetic events using the propagation effects of sub-ionospheric Very Low Frequency signal. He is an Academic Coordinator of ICSP



Mr Tarakanth Bera: He is a Junior Research Scientist at Indian Centre for Space Physics (ICSP), Kolkata, currently pursuing a Ph.D.



Md. Washimul Bari: He is the headmaster of D.N. Saha High School in Malda and is an honorary Senior Research Fellow at ICSP, Malda branch. He works on VLF studies of ionosphere and also data analysis of NASA/ISRO satellites.

Research Work Published/Accepted for Publication

Belwal, K., Bisht, D., Bisht, M. S., et al., Exploring NGC 2345: A Comprehensive Study of a Young Open Cluster through Photometric and Kinematic Analysis, AJ, 2024 , 167, 188

Bisht, M. S., Raj, A., Walter, F. M., Belwal, K., et al., A spectrophotometric analysis and dust properties of classical nova V5584 Sgr, MNRAS, 2025 , 536, 2661

Biswas, S., Bisht, D., Jiang, I-G., "Probing the Possible Causes of the Transit Timing Variation for TrES-2b in the TESS Era", *AJ*, 2024, 168, 176.

Bhattacharjee, A. and Chakrabarti, S.K., Effective potential approach to study hydrodynamics and particle dynamics in Kerr geometry, IJMPD, v. 33, no. 16, 2450059.

Bhattacharjee, A. and Chakrabarti, S.K., Viscous Transonic Accretion Flows in Kerr Black Hole Geometry, ApJ, No. 1, 54

Chakraborty, S., Palit, S., Deb, S, Basak, T, "Modeling of the Variability of D-Region Ionospheric Electron Density During Solar Cycle-24", J. Geophys. Res. Space Phys., 2024, 129.

Chhotaray, B., Jaisawal, G. K., Nandi, P., Naik, S., Kumari, N.,Ng M., Gendreau, K. C., Long-term Study of the First Galactic Ultraluminous X-Ray Source Swift J0243.6+6124 UsingNICER, ApJ, 2024, 963, 132

Elsanhoury, W., Bisht, D., Belwal, K.,et al., Photometric, astrometric, and kinematical characteristics of two Xuyi's open clusters utilizing *Gaia* DR3 data ,AdSpR, 2025, 75, 1502

Jana, A., Ricci, C., Temple, MJ., Chang, H-K., Shablovinskaya, E., Trakhtenbrot, B., Diaz, Y., Ilic, D., Nandi, P., Koss, K., Investigating changing-look active galactic nuclei with long-term optical and X-ray observations, A&A; A, 2025, 693, 19

Layek, N,, Nandi, P., Naik. S., Kumari, N., Jana, A., Chhotaray,B., Long-term X-ray temporal and spectral study of a SeyfertgalaxyMrk 6, MNRAS, 2024, 528, 6269

Nandi, P., Naik, S., Chatterjee, A., Chakrabarti, S. K., Safi-Harb, S., Kumari, N., Layek, N., Accretion properties of a low-mass active galactic nucleus: UGC 6728, MNRAS 2025, 532,1885

Raj, A., Bisht, M., Walter, F. M., Bisht, D.,et al., The dusty Aftermath of a Rapid Nova: V5579 Sgr, Publ Astron Soc Aust., 2024, 41, e051

Singh, A., Teja, R. S., Raj. A., Bisht, D., Bisht, M., Belwal, K., Chakrabarti, S. K., et al., Unravelling the Asphericities in the Explosion and Multifaceted Circumstellar Matter of SN 2023ixf, ApJ, 2024, 975,132S

Saha, S., Pallamraju, D., Kumar, S., Laskar, F. I.,& Pedatella, N. M., OI 630.0 nm post-sunset emission enhancement as an effect of tidal activity over low-latitudes. Journal of Geophysical Research: Space Physics, 2024, e2023JA031928.

Sikdar, R., Chakrabarti, S. K., Bhowmick, D., Measurement of Background Radiations and Spectra of X-ray Sources Using Stratospheric Balloon Missions, Astroparticle Physics, 16203003, 2024

Sikdar, R., Chakrabarti, S. K., Bhowmick, D., Study of Secondary Cosmic Rays and Astronomical X-ray Sources using Small Stratospheric Balloons, Research in A&A, 24f5009, 2024

Impact Factor of Articles in International Journal by ICSP scientists in 2024-2025:

Impact Factor in 2024-2025				
Sl. No	**Journal Name**	**Impact Factor (IF)**	**No. of publications**	**Total IF**
1	ApJ	5.4	3	16.2
2	MNRAS	4.8	3	14.4
3	The Astronomical journal (AJ)	5.1	2	10.2
4	A&A	5.8	2	11.6
5	Astroparticle Physics	4.9	1	4.9
6	Publ Astron Soc Aust	4.6	1	4.6
8	J. Geophys. Res. Space Phys.	2.9	2	5.8
9	Research in Astronomy and Astrophysics,	2.8	1	2.8
10	International J. Mod. Physics	2.0	1	2.0
Total Impact Factor				**72.5**

In Proceedings:

Biswas, S., Bisht, D., Jiang, I-G., Is the orbit of WASP-19 b decaying? , 8th TESS/15th KeplerAsteroseismic Science Consortium Workshop, 2024, 56B

Buroughs, Holly.,Raj, A., Bisht, D. et.al. A Long-term Study of Spectroscopic Variability the B[e] Star HD 50138 at Medium and High Resolution, 245th Meeting of the American Astronomical Society, id. 254.08. Bulletin of the American Astronomical Society, Vol. 57, No. 2 e-id 2025n2i254p08.

Naik, S., Nandi, P., Chakrabarti, S. K., Layek, N., Kumari, N.,Properties of a low-mass active galactic nucleus UGC 6728, 43 rd meeting of ASI, 2025, P112

Layek, Naik. S., N, Nandi, P., Kumari, N., Jana, A., Chhotaray,B., Investigating the temporal and spectral behavior of the Seyfert 1.5 AGN Mrk 6, 43 rd meeting of ASI, 2025, P101

Chakraborty, S., Basak, T., “Modelling of sub-ionospheric VLF signal propagation during a solar flare: an autonomous approach”, Proceedings of URSI Regional Conference on Radio Science (RCRS)-2024, Bhimtal, 2024.

Chatterjee, A., Nandi, P., Macintyre, B., Safi-Harb, S., Jana, A.,Enigmatic X-ray variability of ESO 141-G55 over the last two Decades, 45th COSPAR Scientific Assembly 2024, 45, 1897

Chatterjee, A., Hayasaki, K., Macintyre, Nandi, P., Kumari, N.,Jana, A., Safi-Harb, S., Naik, S., Tidal Disruption Events: Supermassive Black Holes Living the Life of Stellar Mass Black Holes, 45th COSPAR Scientific Assembly 2024, 45, 1400

Jana, A., Ricci, C., Temple, M., Chang H-K., Shablovinskaia,E., Nandi, P., Ilic, D., Exploring Changing-State AGNs with Long-Term Multiwavelength Observations, 45th COSPAR Scientific Assembly 2024, 45, 1902

Nandi, P., Chatterjee, C., Chakrabarti, S. K., Jana, A., Naik, S.,Chang H-K., Safi-Harc, S., Heyl, J., Survey of Bare Active Galactic Nuclei in the Local Universe (z < 0.2): On the Origin of Soft Excess, 5th COSPAR Scientific Assembly 2024, 45, 45, 1830.

Members of Scientific Societies/Committees

Devendra Bisht is a member of the International Astronomical Union (IAU), affiliated with Division A (Fundamental Astronomy), Division C (Education, Outreach and Heritage), Division G (Stars and Stellar Physics), and Division H (Interstellar Matter and Local Universe). He is also a member of the Astronomical Society of India (ASI).

Sayak Chakraborty is a member of Indian Radio Science Society (InRass) Student member from September-2024 to December-2024, Membership ID: SM0192024

Tamal Basak is an Associate of the Committee on Space Research (COSPAR), Paris, France, and an invited member of the European Space Weather and Space Climate Association (E-SWAN). He is also a life member of the Calcutta Mathematical Society (CMS).

Ph.D. Degree Received

Rana Ghosh received his Ph.D. degree on ”Understanding the Evolutionary Stages of The Star-Forming Region by Chemical Diversity”, (University of Calcutta), 2024.

Riya Bhowmick received her Ph.D. degree on “Outbursting Nature of Compact X-ray Binaries”, (University of Calcutta), 2024.

Rupnath Sikdar received his Ph.D. degree on “X-Ray Astronomy Using Low Cost Stratospheric Balloons”, (University of Calcutta), 2024.

Sujoy Kumar Nath received his Ph.D. degree on “Multi-Satellite Observations Of Several Low Mass X-Ray Binaries”, (University of Calcutta), 2024.

Participation in National / International Conferences & Symposia

Devendra Bisht delivered an online talk at the *30th Young Scientists' Conference on Astronomy and Space Physics*, held in Kyiv, Ukraine, from April 22 to 26, 2024. On December 7, 2024, he delivered a talk during ICSP's Silver Jubilee celebration and served as a convener on the organizing team. On January 3, 2025, he delivered a talk at the one-day conference *Space Exploration for Students*, held at the Indian Centre for Space Physics (ICSP), Kolkata. On January 6 and 7, 2025, during an observatory visit by students from South Point Institute, Howrah, he delivered a talk, interacted with students and teachers, and participated in a sky-watching session.

Prantik Nandi presented “Survey of Bare Active Galactic Nuclei in the Local Universe ($z < 0.2$): On the Origin of Soft Excess” at the 45th COSPAR Scientific Assembly, held in Busan, South Korea, from July 13 to 21, 2024. He also delivered a talk titled “Appearance and Disappearance of Soft Excess” at the Indian Centre for Space Physics (ICSP), Kolkata, in September 2024, and gave another talk on “Studies of Compact Objects in X-rays” at ICSP, Kolkata, in January 2025.

Sayak Chakraborty presented a Oral Presentation at URSI Regional Conference on Radio Science (RCRS)-2024, held at Graphic Era Hill University, Bhimtal, from 22nd to 25th October, 2024.

Shraddha Biswas presented a poster titled *'Investigating Transit Timing Variation in the Exoplanet TrES-2b'* held during the National Conference on Data Science Innovations in Astronomy (NCDSIA), organized by the Department of Statistics, Amity University Kolkata, and the IUCAA Center for Astronomy Research and Development (ICARD), Kolkata, from 3rd to 4th January 2025

Sourav Palit presented the talk “Calculating Responses and Atmospheric Scattering Contribution for Daksha” at the Transients 2024 meeting, Department of Physics, IIT Bombay, on April 2, 2024. He also presented a talk titled “Ionosphere as a Space Detector: GRB Signature in VLF Radio Wave Propagation” at *Frontiers in Modern Astronomy, Astrophysics, and Space Science*, held as part of the closing ceremony of ICSP’s Silver Jubilee Programme on December 7, 2024. On January 1, 2025, he delivered a talk titled “Astronomy and Weather Science with ICSP Balloon Expeditions” at *Space Exploration with Students*, a one-day seminar organized by the Indian Centre for Space Physics (ICSP), Kolkata.

Sovan Saha delivered an oral presentation titled “Short Zonal Scale Sizes of Gravity Waves: Possible Precursors to the Occurrence of Equatorial Plasma Bubbles” at the 45th COSPAR Scientific Assembly (COSPAR 2024), held in Busan, South Korea, in July 2024.

Tamal Basak delivered a talk titled “Sub-Ionospheric VLF Propagation Science and Multifarious Aspects of D-Region Modelling During Solar Flares” at the Department of Physics, Presidency University, Kolkata, India, on May 15, 2024. He also delivered an oral presentation titled “Multifarious Aspects of D-Region Modelling During Solar Flares Using Sub-Ionospheric VLF Propagation” at the SPASE Seminar, IIT Kanpur, on August 22, 2024, and a talk titled “Chandrayaan-3: India’s Lunar Leap” at the National Space Day Celebration, Srikrishna College, Nadia, West Bengal, India, on August 29, 2024. On November 7, 2024, he delivered an oral presentation titled “Studying Solar–D-Region Ionosphere Interaction Using Propagation Effects of Very Low Frequency Signals” at the 20th European Space Weather Week (ESWW2024), during Session CD1 on solar and lightning forcing of the ionospheric D-layer, in Coimbra, Portugal. He also delivered an oral presentation titled “Long-Term Lower Ionospheric Modulation Due to Solar Activity” at the One-Day Conference on *Frontiers in Modern Astronomy, Astrophysics, and Space Science*, ICSP, Kolkata, India, on December 7, 2024. In 2025, he delivered a talk titled “Scope of Student Involvement in VLF Campaign for Ionospheric Studies” at *Space Exploration with Students*, a one-day seminar held at ICSP, Kolkata, India, on January 3, and another talk titled “India’s Lunar Quest: Chandrayaan-3 and Beyond” at the National Science Day Celebration, Barasat Government College, North 24 Paraganas, West Bengal, India, on February 28.

S.K. Chakrabarti presented several talks including organizing the “Black Hole Session” at the COSPAR conference at Busan, South Korea and giving a talk there.

Meetings organized

Devendra Bisht contributed to setting up the ICSP Museum exhibition at the 248th U.S. National Day celebration held on July 19, 2024. He was part of the core organizing team for ICSP’s Silver Jubilee Celebration held on December 7, 2024, and served as a convener for the event. He also contributed to organizing the International Conference on Astrophysics and Space Science with Meteorological Balloons, held from April 2 to 4, 2025, actively participating in planning, coordination meetings, and discussions.

Prantik Nandi organized a Half Day Workshop on Machine Learning and Its Applications (A part of Silver Jubilee Celebration of ICSP) on 7th September 2024, at Indian Centre for Space Physics, Kolkata, He also organized another workshop on Two-Component Advective Flows (TCAF): Fitting Procedure and Results for Stellar and supermassive black holes. (A part of the Silver Jubilee Celebration of ICSP), 25th September 2024, ICSP and Space Exploration with Students, 3rd January 2025, ICSP

Sourav Palit served as a member of the Organizing Committee for Frontiers in Modern Astronomy, Astrophysics, and Space Science, the closing ceremony of ICSP's Silver Jubilee Programme, held on December 7, 2024. He also served as the convener of the one-day seminar Space Exploration with Students, organized at ICSP on January 3, 2025.

Tamal Basak served as a member of the Local Organizing Committee (LOC) for the Space Exploration with Students one-day seminar at ICSP on January 3, 2025, and Frontiers in Modern Astronomy, Astrophysics, and Space Science, the closing ceremony of ICSP's Silver Jubilee Programme, on December 7, 2024. He also served as a convener, jointly with Dr. Carine Braine, Dr. Liliana Macotela, and Dr. Mark Clilverd, for Session CD1, "Solar and Lightning Forcing of the Ionospheric D-Layer: Recent Developments and Results," at the 20th European Space Weather Week (ESWW2024), held in Coimbra, Portugal, on November 7, 2024. Additionally, he was a member of the LOC for the Half-Day Workshop on Machine Learning and Its Applications, held at ICSP on September 7, 2024.

Visits abroad from the Centre

Tamal Basak visited Visited Coimbra, Portugal in November 2024to attend 20th European Space Weather Week (ESWW)

Prantik Nandi, S.K. Chakrabarti and S. Saha visited S. Korea in connection with COSPAR conference in July, 2024.

Teaching and Guiding of Certificate Course and Pre-PhD Students

Dr. Devendra Bisht taught both certificate course work and PhD-level classes at ICSP, focusing on stellar evolution, star formation, telescope operations, and transient astronomical phenomena. During this period, he guided two internship students in CCD data reduction and photometric analysis, and also mentored one student under the institute's pre-PhD diploma programme.

Dr. Prantik Nandi taught students enrolled in the following courses: AS100 (Gateway to the Universe) and AS101 (Astrophysics and Astronomy – The Language of the Cosmos) during Certificate Courses Sessions 1 and 2. He also taught Research Methodology.

Dr. Sourav Palit taught students enrolled in the following courses: AS100 (*Gateway to the Universe*), AS104 (*Space Weather: Exploring the Outer Atmosphere*), AS106 (*Development of Space Instruments*), and AS107 (*Science of Rockets*).

Dr. Sovon Saha taught topics under the courses *Gateway to the Universe* and *Space Weather: Exploring the Outer Atmosphere*. His teaching covered the Solar System; the Sun (three lectures); the Chemistry of the Ionosphere; Geomagnetic Storms; and Ground- and Space-Based Instruments in Space Weather Research (two lectures). He also taught Error Analysis as part of the Ph.D. coursework.

Dr. Tamal Basak taught students enrolled in the following courses: AS100 (*Gateway to the Universe*), AS101 (*Astrophysics and Astronomy – The Language of the Cosmos*), and AS104 (*Space Weather: Exploring the Outer Atmosphere*).

Prof. S.K. Chakrabarti taught several courses on all the sessions. In the AS100 course

“Gateway to the Universe” his talks cover the Universe from large scale to small scale. In AS101 course “Astrophysics and Astronomy – The Language of the Cosmos” he talks about the expanding , big bang nucleosynthesis, Olber’s paradox and its resolution, rotation curve and dark matter, Newtonian Cosmology, Cosmic microwave radiation, era of decoupling etc. In AS103, the course on Relativistic Astrophysics around Black Holes, he talks about the way matter accretes on black holes. He discusses all the models since 1952s till the modern model of two component advective flows. He also teaches the way spectra is computed and observed spectra is fitted.

Summary of Research Activities of the Scientists at the Centre

Astrobiology/Astrochemistry

Normally the studies of the formation of molecules in gas and grain phases in interstellar media are covered in this subject. Till 1999 or so, workers around the world were engaged in formation of very simple molecules such as OH, CN, H2O, HCN, HCHO etc. In 2000s the scope of this subject was expanded by the pioneering work of Chakrabarti and Chakrabarti (2000ab) where it was shown that very complex bio-molecules could also be created during the collapse of molecular clouds. In recent years ALMA data provides evidences that at least the pre-cursor molecules have been observed in the gas phase, even though many amino acids were already found in several asteroids and meteorites, i.e., in solid phases.

Indian Centre for Space Physics has created a series of experts in this subject who have been following this up at various institutes in India and abroad. Codes on studies such as Monte Carlo simulations, hydrochemical evolution of complex molecules, fitting cloudy models and extracting physical parameters, have been created here and disseminated to the past research scholars. Indeed, most of the activities in this subject in India can be traced back to ICSPs core competence in this area of research. New work is now carried out in the field of the emergence of the DNA and RNA world on Earth. We are also carrying out numerical simulations of star/planet formation. Some progress has been done and the results would be reported very soon. ICSP thus remains the core institute in this subject and will continue to contribute in future.

High Energy Astrophysics

Data fitting of Active Galactic Nuclei (AGNs) using Two Component Advective Flow models have been done.

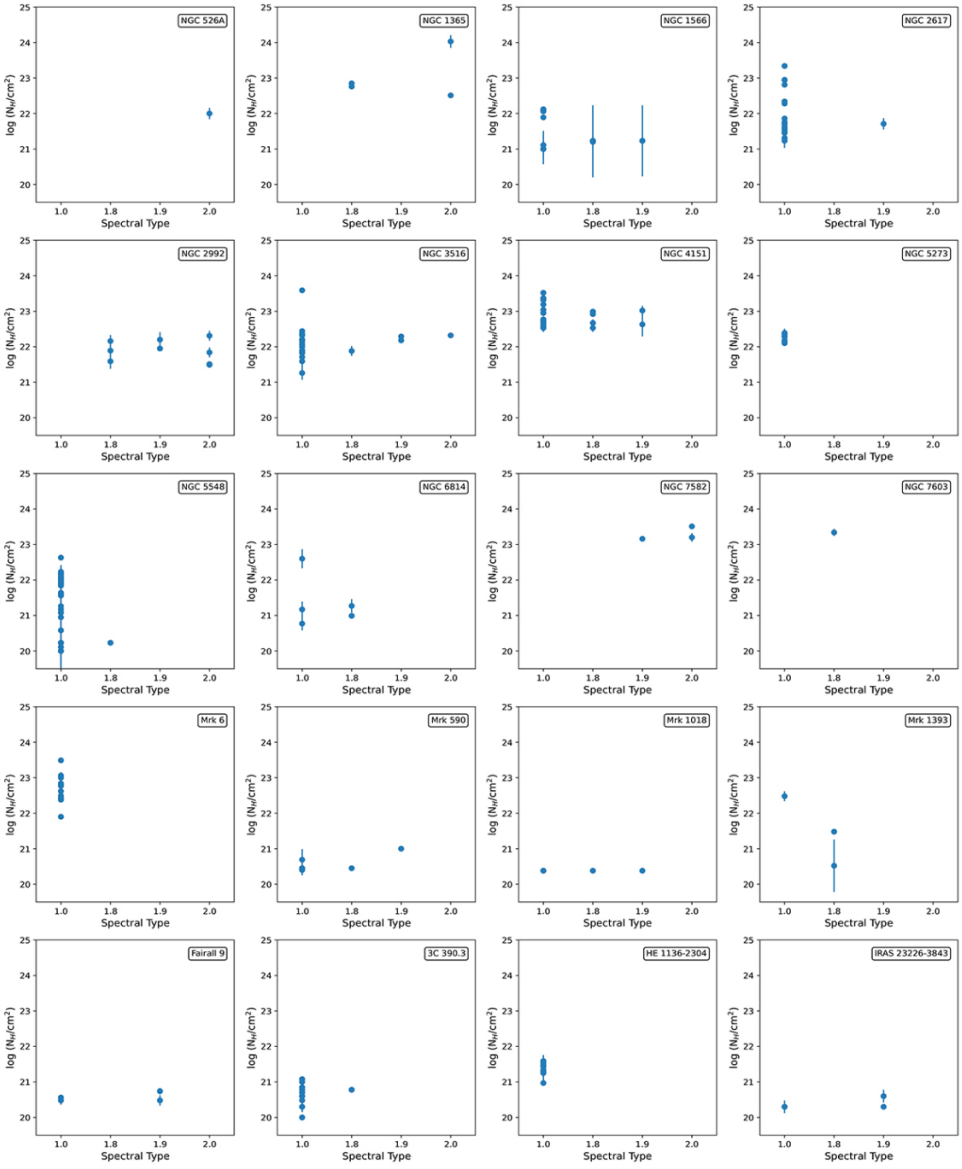
A VizieR Online Data Catalog: Survey of bare z<0.2 AGNs particularly those having X-ray soft excess has been created. We employed publicly available archival data from the XMM-Newton and Swift observatories using HEASARC. We included the observations from XMM-Newton in the X-ray range of 0.2-10keV obtained with the EPIC-pn detector. The sample data from Swift/XRT were obtained between 2005 January and 2021 December (Nandi, Chatterjee, Jana, Chakrabarti, Chang, Heyl 2024)

We present an extensive temporal and spectral study of the Seyfert 1 AGN Mrk 50 using 15 yr (2007–2022) of multiwavelength observations from XMM-Newton, Swift, and NuSTAR for the first time. From the timing analysis, we found that the source exhibited variability of ∼20% during the 2007 observation, which reduced to below 10% in the subsequent observations and became nonvariable in the observations from 2010 onward. From the spectral study, we found that the spectra are nearly featureless. Nondetection of absorption in the low-energy domain during the 15 yr of observation infers the absence of obscuration around the central engine, rendering the nucleus a "bare" type. A prominent soft X-ray excess below 2 keV was detected in

the source spectrum during the observations between 2007 and 2010, which vanished during the later observations. To describe the nature of the soft excess, we use two physical models, such as warm Comptonization and blurred reflection from the ionized accretion disk.

Both of the physical models explain the nature and origin of the soft excess in this source. Our analysis found that Mrk 50 accretes at a sub-Eddington accretion rate (λEdd = 0.13–0.02) during all of the observations used in this work (Laik, Nandi, Naik, Jana, 2025)

We investigate changing-look active galactic nuclei with long-term optical and X-ray observations. Broad emission lines in the UV/optical spectra of changing-look active galactic nuclei (CLAGNs) appear and disappear on timescales of months to decades. We investigate how changing-look (CL) transitions depend on several active galactic nucleus (AGN) parameters, such as the accretion rate, obscuration properties, and black hole mass. We studied a sample of 20 nearby optically identified CLAGNs from the BAT AGN Spectroscopic Survey (BASS) using quasi-simultaneous optical and X-ray observations taken in the last ∼40 years. We find that for all CLAGNs, the transition is accompanied by a change in the Eddington ratio. The CL transitions are not associated with changes in the obscuration properties of the AGNs. CLAGNs are found to have a median Eddington ratio lower than that of the AGNs in the BASS sample in which CL transitions were not detected. The median transition Eddington ratio (the Eddington ratio at which an AGN changes its state) is found to be ∼0.01 for type 1 ↔ 1.8, 1.9, and 2 transitions, which is consistent with the hard ↔ soft state transition in black hole X-ray binaries. Most CL events are constrained to have occurred within 3–4 years, which is considerably shorter than the expected viscous timescale in AGN accretion disks. We conclude that the transitions of the optical CLAGNs studied here are likely associated with state changes in the accretion flow, possibly driven by disk instability (Jana, Ricci, Temple, Chang, Shablovinskaya, Trakhtenbrot, Diaz, Ilic, Nandi, and Koss. 2025)



Variation in NH as a function the spectral state. In NGC 526A, NGC 7603, and HE 1136–2304, the NH value is only available for type 2, type 1.8, and type 1.0 states, respectively (from Jana et al. 2025)

We are completing the testing of a pseudo-Newtonian potential written to study hydro-dynamics, magnetohydrodynamics and radiative transfer of matter accreting onto a black hole. We study viscous transonic accretion flows in vertical equilibrium in Kerr geometry. We employ the pseudo-Kerr formalism that accurately describes transonic flows around Kerr black holes and is applicable for modeling observational data. We study the effects of viscosity on the nature of sonic points and the parameter space that allows an accretion flow to possess multiple sonic points. We concentrate on the accretion solutions that can have centrifugal pressure supported shock waves and find that the shocks are weaker and are located farther from the black hole as the viscosity is enhanced. Moreover, if the viscosity is greater than a critical value, shocks do not form and the accretion flow can pass only through the inner sonic point close to the black hole and remains subsonic and Keplerian throughout the accretion disk. Since the resonance oscillation frequencies of the shock waves provide a measure of the observed quasiperiodic oscillation (QPO) frequencies, and since the location of shock waves depend on the spin of a black hole, it is clear that the QPO frequencies must depend on the spin of black hole as well. Our pseudo-Kerr approach makes it easier to compute spectra from an accretion flow with viscous dissipation and radiative cooling around a spinning black hole. (Bhattacharjee, Chakrabarti, 2024)

We derive the exact form of effective potential in Kerr geometry from the general relativistic radial momentum equation. The effective potential accurately mimics the general relativistic features, over the entire range of the spin parameter $-1<a<1$. We obtain the exact expression of the rate of dragging of inertial frames that can be used to study the relativistic precession of twisted accretion disks that are formed when the disk outskirts are tilted relative to the equatorial plane of the black hole. We then present an effective potential that provides a simplistic approach to study particle dynamics using physical concepts analogous to the Newtonian physics. We compare the equatorial as well as off-equatorial particle trajectories obtained using our potential with the general relativistic solutions. We find that our approach can capture the salient features of Kerr geometry and is applicable to studies of accretion processes around Kerr black holes (Bhattacharjee, Chakrabarti, 2024)

Fabrication of ionospheric research receivers at ICSP

New VLF and ELF receivers with an optional band pass filter has made in the Lab for DST-SERB Project and installing the same at different places in India. We have designed, fabricated, assembled and produced 5” diameter optical telescopes at our workshop. We have also fabricated various types of payloads for our balloon flights. These are mainly for data acquisition in X-ray and Gamma-ray bands (Bhawmick).

Study of space radiation through balloon-borne X-ray/gamma ray experiments and Monte Carlo simulation

Study of the atmospheric and near-space radiation environment is very important for many purposes like: space expeditions, aviation, balloon-borne or satellite-borne experiments and even for the radiation mitigation on Earth’s surface. We are studying the Earth’s atmospheric and space radiation environment through Monte Carlo simulation and direct experiments with radiation detectors on board balloon gondola platform (Sikdar, Chakrabarti, Bhawmick).

Study of X-ray spectral and timing properties of astronomical sources using low-cost stratospheric balloons

Astronomical objects, such as the Sun, accreting matter around black holes, neutron stars, white dwarfs, etc. are known to emit X-rays and gamma-rays. Some of these sources, such as highly magnetized neutron stars, show periodic pulsations. Even accreting matter around black holes and neutron stars shows timing properties including quasi-periodic oscillations. In this paper, we use the data of low-cost, lightweight, high-altitude (∼42 km) small, stratospheric balloon-borne missions of the Indian Centre for Space Physics. We measure the intensity of the secondary cosmic rays, the radiation fluxes, and the spectra of persistent X-ray sources or transient events such as solar flares and gamma-ray bursts, apart from routine weather parameters. In this study, we present the source detection method without an onboard pointing system and the temporal and spectral behaviour of the quiet Sun. We also analyse the data containing Crab in the field of view to find the pulsation of the Crab pulsar. During the analysis of the source detection and spectrum of the solar X-rays, we calculate the detector's background radiation (mainly secondary cosmic rays) using physical assumptions and also take care of the atmospheric absorption effects. Finally, we show the source detection processes for the strong sources such as the Sun, Crab, and Cyg X-1, obtaining the quiet Sun's spectrum. Among the interesting timing properties, we present the result for the Crab pulsar and find the well-known ∼33 Hz pulsations whenever our instrument pointed to the Crab.

Study of secondary cosmic rays using small stratospheric balloon missions

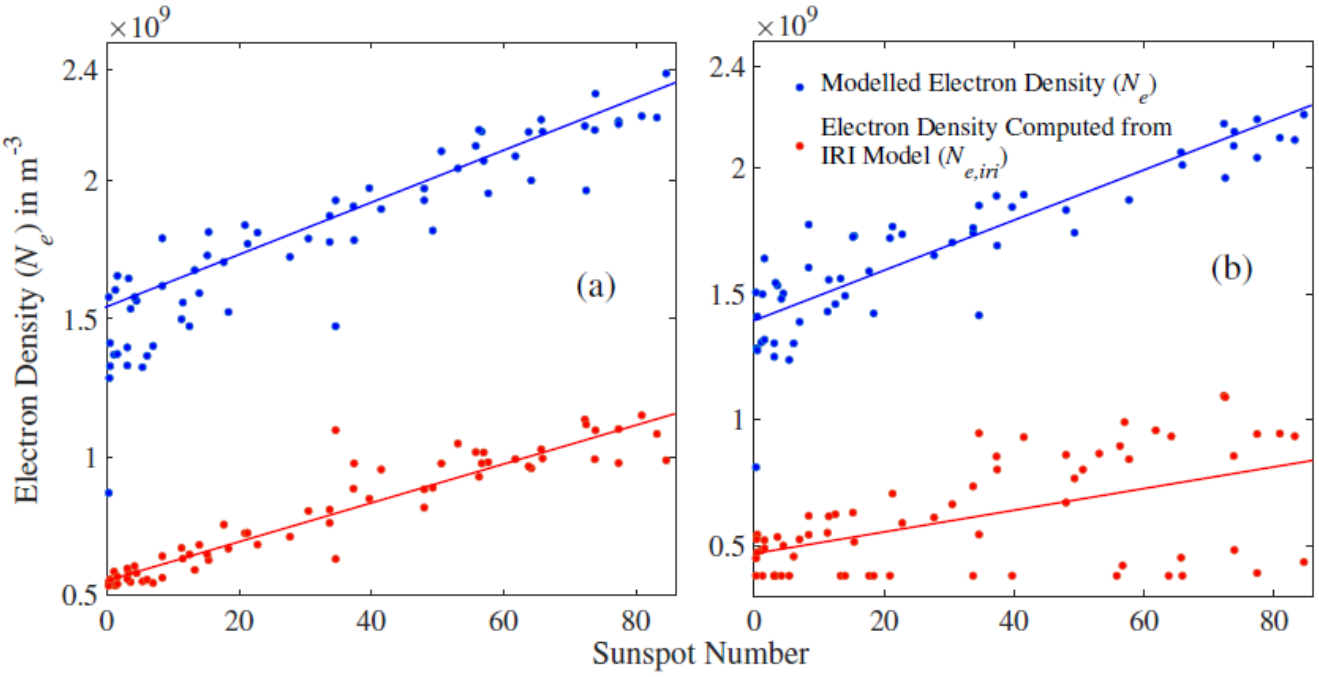
Secondary cosmic rays are produced from the interaction of primary cosmic rays, which are high-energy (∼GeV) particles originating from outer space, primarily, protons (∼89%) and alpha particles (∼10%) with atoms (mainly nitrogen and hydrogen) present in our Earth's atmosphere. Such rays are dependent on solar activity and geomagnetic latitude through magnetic rigidity and are found to be modulated by these factors. For analysis of secondary cosmic ray data, we use the Indian Centre for Space Physics's data obtained through small stratospheric balloon-borne experiments. In the present paper, we have measured the secondary cosmic ray intensity at low geomagnetic latitude of ∼14.50◦N in the low energy range of 25–60 keV from the ground to 30 km altitude for different detectors used in various balloon missions because such missions are almost detecting the X-ray sources above 30 km till 42 km. We also calculated background flux of the detector with the help of some justifiable physical assumptions, secondary cosmic gamma-ray component measurements, and assumed internal background functions.
Finally, using our data of 2012–2019, which falls in the 24th solar cycle, we have shown that there is a clear anti-correlation between cosmic ray intensity at Regener–Pfotzer maximum and the solar activity.

Study of solar flares and gamma-ray bursts using low-cost stratospheric balloon borne experiments

Solar flare intensity is strongly dependent on the phase in the solar cycle, the structure and dynamics of the magnetic field near sunspots, and also on occasional solar coronal mass ejections. In this paper we study some of the solar flares detected by the stratospheric balloon borne experiments of Indian Centre for Space Physics. We also observe a gamma-ray burst which is believed to be originated from sudden energy release in gamma rays. In the hard X-ray region of 10 − 100 keV, we present and analyze data from various classes of solar flares and a gamma-ray burst. Because of natural constraints present in balloon borne experiments we receive data up to about a height of ∼ 42 km. The Earth's residual atmosphere at this height absorbs the lower energy part of the spectrum. Moreover, the background radiation (mainly secondary cosmic rays) introduces noise. We show how we circumvent these limitations and create the accurate light curves and the spectra of a few solar flares and a gamma-ray burst.

Ionospheric Research and Earthquake Prediction

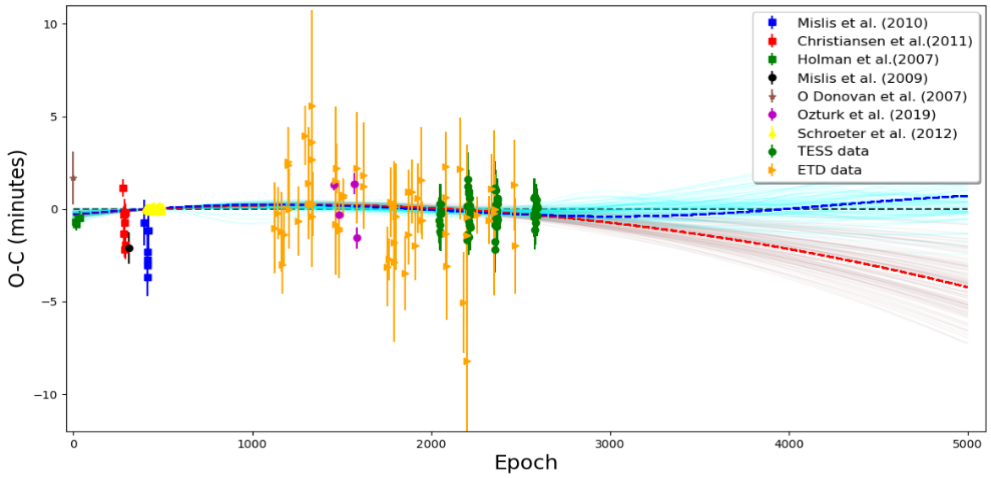
Solar cycle variation of earth's atmosphere, particularly the ionosphere is of particular interest in the field of space science and space weather studies. In this article, we present the outcome of our detailed quantitative study on solar cycle variation of lower ionospheric properties using numerical investigation. First, we seek to model and compare the collective D-region ionization rates (q's) due to the individual contributions from the ionizing sources, namely, (a) solar extreme ultraviolet (EUV) radiation including the Lyman-α irradiation and (b) solar X-ray irradiation throughout the 24th solar cycle (C24). Then, we compute the electron density (Ne profiles using the ionization rates. We report significant solar cycle variation in ionization rate and electron density profiles for the entire span of C24. We use the sunspot number (SPN) profile to substantiate the finer details of Ne profile during C24. For the segments of the D-region above two different geographic coordinates, we report that Ne profiles show a consistent "dual peak" nature. It is very similar to the SPN profile during C24. As a next-order validation, we compare our modeled Ne profiles with their IRI-2020 counterpart (Ne,iri). Their overall trends are found to be in agreement. Finally, we discuss the response of the D-region in terms of Ne due to C24. The work lays the foundation for our upcoming studies on D-region response to solar cycle variation with Very Low Frequency (VLF) observation (Chakraborty, Basak, Palit, Deb, 2024).



Variation of Modeled D-region electron density at 80km altitude (upper dots) and its IRI-2020 counterpart (lower dots) during 24th Solar Cycle over the equator (left) and 45 degree North (right) as a function of the monthly average of SPN.

Probing the Possible Causes of the Transit Timing Variation for TrES-2b in the TESS Era

The study of the hot Jupiter TrES-2b using 64 high-quality transit light curves from NASA's TESS mission, 60 from the Exoplanet Transit Database, and 106 previously reported midtransit times led to a significant improvement in the planet's orbital ephemerides. While no short-period transit timing variations (TTVs) were detected—suggesting the absence of nearby perturbing bodies—the researchers investigated potential long-term TTVs. Among the possible causes considered (orbital decay, apsidal precession, the Applegate mechanism, and the Rømer effect), orbital decay was the most favored explanation, supported by a ΔBIC value of 4.32. The analysis revealed that TrES-2b's orbital period is shrinking at a rate of approximately –5.58±1.81 milliseconds per year. Assuming this decay results from tidal dissipation within the host star, the stellar tidal quality factor was estimated to be around 9.9×10^{3}-2 to 3 orders of magnitude lower than theoretical predictions for similar systems. This suggests unusually efficient tidal dissipation and underscores the need for further precise photometric and radial velocity observations to better understand the cause of the observed orbital changes

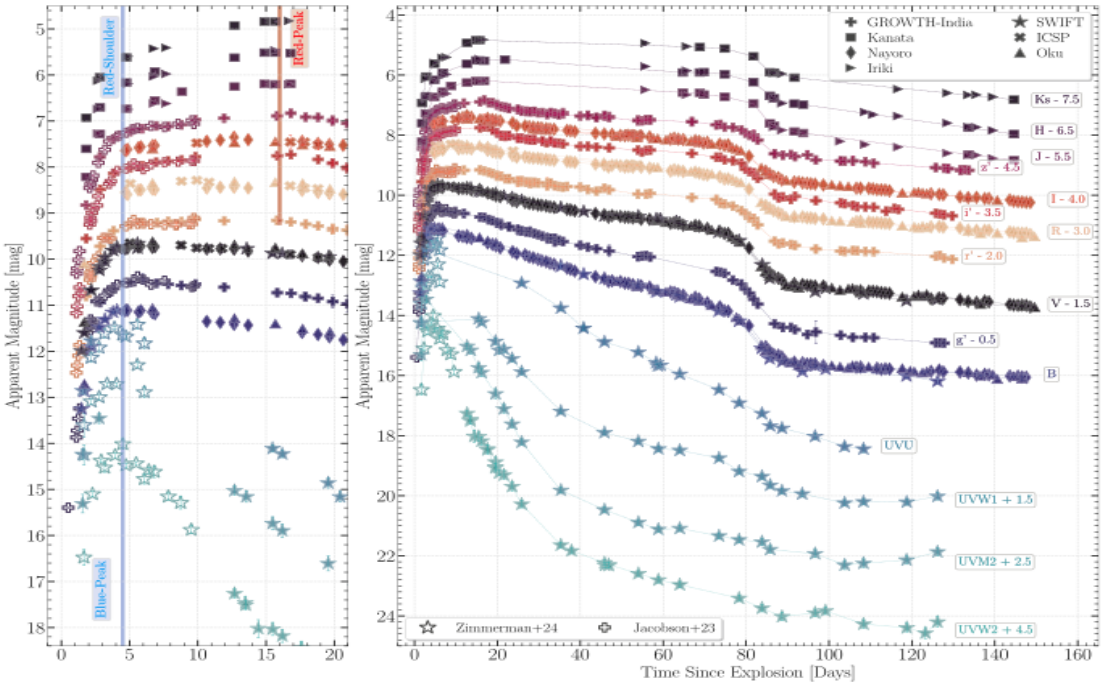


TTV diagram for analyzing 230 midtransit times of TrES-2b. The dashed black line and red and blue curves represent the linear, orbital decay, and apsidal precession models. The lines are drawn for 100 randomly chosen sets of parameters from the Markov chains of posteriors of the orbital decay (brown) and apsidal precession (cyan) models. The models are extrapolated for the next ~17 yr to illustrate the broad spectrum of possible solutions.

Unravelling the Asphericities in the Explosion and Multifaceted Circumstellar Matter of SN 2023ixf

The study presents a detailed photometric, spectroscopic, and polarimetric analysis of the Type II supernova SN 2023ixf. Utilizing multi-epoch observations including optical photometric data obtained from the Eastern India's largest optical telescope (24-inch, Vashistha) at the IERCOO Observatory, ICSP, the paper explores the complex circumstellar environment and explosion geometry of the event. The temporal evolution of polarization reveals three distinct peaks, indicating asymmetric structures in the circumstellar matter (CSM), shock front, and inner ejecta. Hydrodynamical light-curve modeling suggests a progenitor of ~10 $M_\odot$, a radius of 470 $R_\odot$, and an explosion energy of 2×10^{51} erg, with the presence of a two-zone CSM marked by varying

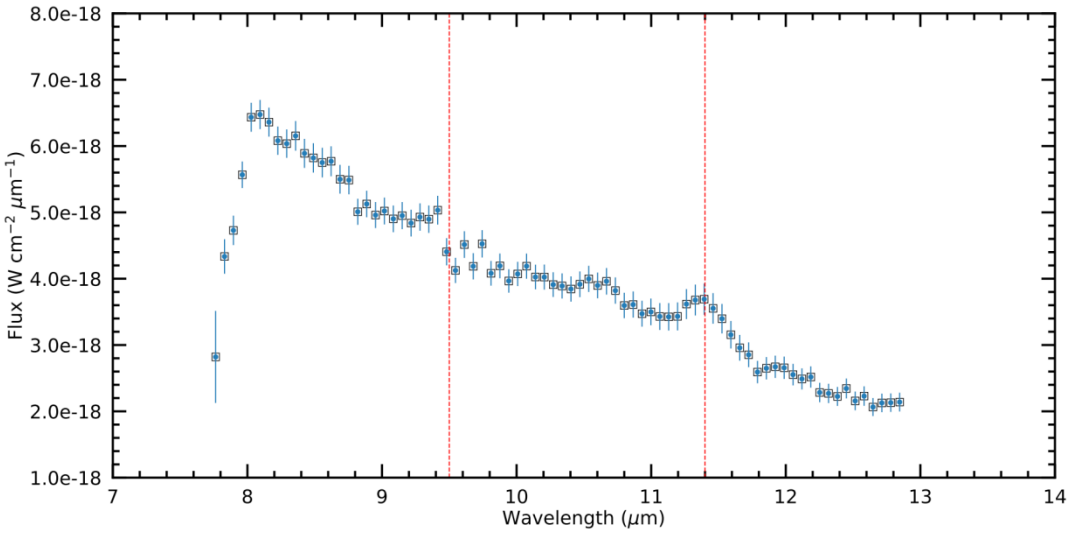
mass-loss rates. The IERCOO data significantly contributed to tracing the early light curve evolution and constraining explosion parameters. Overall, the study highlights the role of asymmetric mass loss and CSM interaction in shaping the observables of SN 2023ixf, and underscores the valuable contributions of small to mid-sized observatories in time-domain supernova research.



Multiwavelength photometry of SN 2023ixf spanning UV, optical, and NIR wavelengths. Template subtraction was performed only in the UV bands (UVW2, UVM2, and UVW1) due to non-negligible contamination. The left-hand panel provides a close-up of the initial rise across all bands, annotated as blue peak and red shoulder, and the subsequent red peak. ICSP data indicated by cross sign.

The Dusty Aftermath of a Rapid Nova: V5579 Sgr

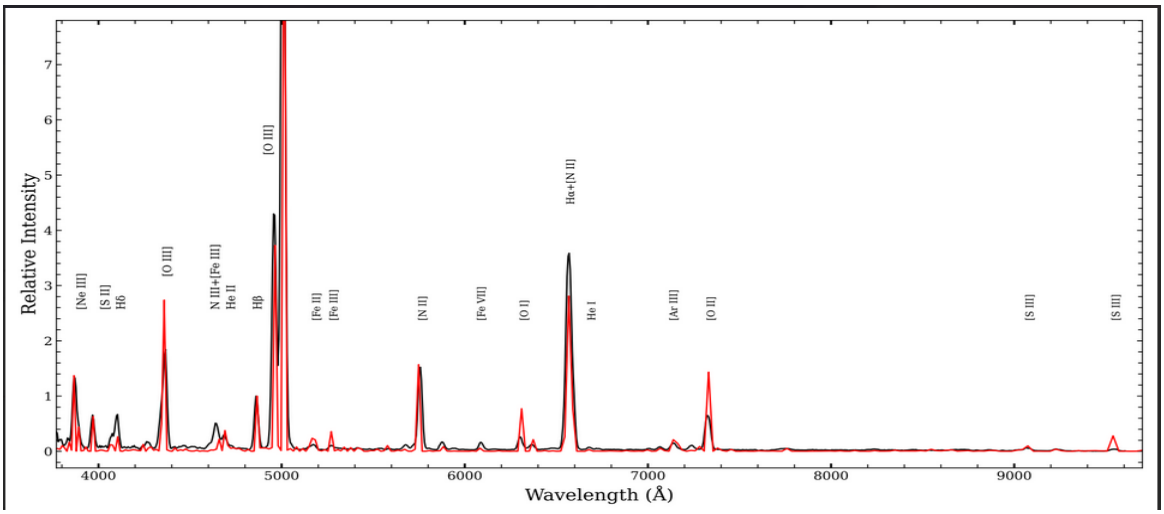
Our research on V5579 Sgr revealed it to be a fast nova with a unique dust formation episode that commenced approximately 20 days after the outburst. This places V5579 Sgr among the rare fast novae known to form dust within such a short timescale (≤20 days). A significant finding was the persistence of cool dust, with a temperature of approximately 400±50 K, even 702 days post-outburst. Furthermore, the spectral energy distribution of V5579 Sgr exhibited distinct features at 9.5 and 11.4μm. These features are strongly associated with Polycyclic Aromatic Hydrocarbon (PAH)-like structures, similar to those previously observed in novae such as V2362 Cygni and V705 Cas.This work was also published in the Monthly AstroPAH Newsletter October 2024. The detection of these PAH-like features in V5579 Sgr adds it to the growing list of novae where such complex organic materials have been identified, providing crucial insights into the chemical processes occurring within nova ejecta. Our detailed abundance analysis of V5579 Sgr further supported the conditions favorable for dust grain formation. Specifically, we found a high carbon abundance in the early decline phase, approximately 15 days post-outburst. This early enhancement of carbon is a key factor that promotes the condensation of carbonaceous dust grains, aligning with the observed rapid onset of dust formation in this system. These findings collectively contribute to a better understanding of the complex interplay between elemental abundances, dust formation mechanisms, and the long-term evolution of nova ejecta.



The 7.70 to 14.00 µm low-resolution spectrum of V5579 Sgr was obtained using Gemini-South with TReCS on Day +522.26. The vertical dashed red lines indicate the PAH complexes previously identified in nova V2362 Cyg spectra. The slope of the observed TReCS spectrum follows that of the Rayleigh-Jeans tail of a hot blackbody, consistent with emission from condensed dust in the ejecta.

A spectrophotometric analysis and dust properties of classical nova V5584 Sgr

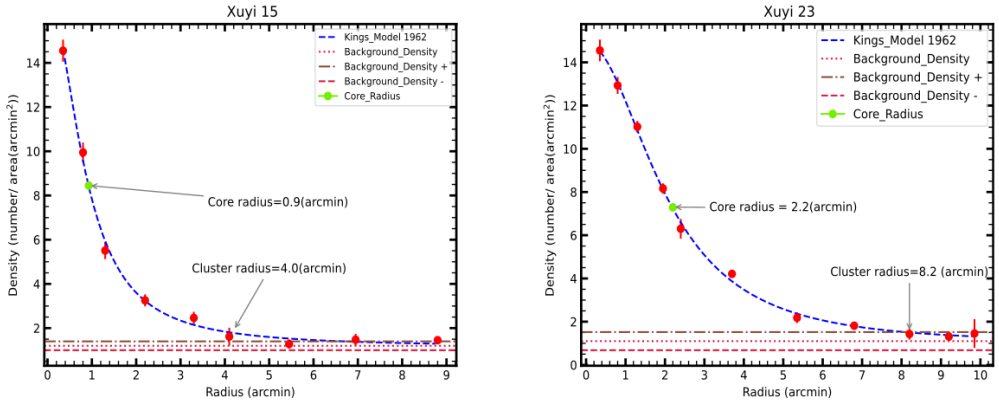
In our study of moderately fast classical nova V5584 Sgr, the observed NIR excess indicates the formation of a significant amount of optically thick dust within the nova ejecta. A notable peculiarity identified in our study is its roughly constant luminosity of approximately across two distinct epochs of multiwavelength spectra (day 13 and day 292). This stable energy output from the central white dwarf over a significant period during its outburst evolution. This finding supports the theoretical prediction that novae radiate at a nearly constant luminosity until the nuclear fuel is exhausted on the white dwarf surface. Furthermore, our multiwavelength abundance analysis of V5584 Sgr suggests that the carbon abundance (C/H) was 10.8 times solar value on day 13 (pre-dust), with no lines detected in the subsequent phase (post-dust). This indicates that the ejecta might be rich in carbon dust grains, and the observed decrease in carbon abundance can be attributed to its depletion into dust grain formation.



Best-fit optical CLOUDY synthetic spectrum (red line) plotted over the observed spectrum (black line) of V5584 Sgr obtained on day 292 post outburst.

Photometric, astrometric, and kinematical characteristics of two Xuyi's open clusters

This paper presents a detailed photometric, astrometric, and kinematical analysis of two poorly studied open clusters, Xuyi 15 and Xuyi 23. The authors identified 570 and 824 probable member stars, respectively, based on proper motion and membership probability above 60%. Structural parameters, including core, limiting, and tidal radii, were determined using King profile fits to radial density distributions. Fundamental cluster parameters such as distance (~7.05 kpc for Xuyi 15 and ~6.90 kpc for Xuyi 23), reddening, and age (log age ≈ 9.0) were estimated through CMD fitting with Padova isochrones. The clusters' mass functions yielded slopes close to the Salpeter value (α ≈ 2.5 and 2.3), indicating the presence of low-mass stars and limited dynamical disruption. Dynamical relaxation analysis revealed that both clusters are dynamically relaxed systems. Kinematical properties, including apex coordinates and solar motion parameters, were also computed, confirming that the clusters are gravitationally bound and located in the outer Galactic disk. These results contribute to understanding the formation, evolution, and dynamics of open clusters in the Milky Way.



Radial density profiles of Xuyi 15 and Xuyi 23 with King model fits (blue dashed lines). Horizontal lines indicate background and central densities; error bars reflect sampling statistics.

Work in Optical astronomy were carried out by: Dr. Ashis Raj, Dr. Devendra Bisht, Mr. Kuldeep Belwal, Mr. Mohit R. Bisht, Ms. Shraddha Biswas, Prof. S.K. Chakrabarti, Mr. Bhawmick. For details see the list of research papers.

Ionospheric and Earthquake Research Centre and Optical Observatory (IERCOO)

IERCOO is located at about 80 km away from Kolkata. Its almost 20 kattha land campus contains the main building with VLF laboratory, optical observatory, a seminar room and some observers guest house. In addition, it has a guest house called Dhruva, another larger seminar room called Saptarsi, a hut for distinguished guest, and faculty/staff quarters. All these belong to an inter-connected maze of buildings. Separately located are the Dining/kitchen hall and the dining hall for the faculties and guests.

The Observatory has two major telescopes, namely, Arundhati (10 inch diameter Meade) and Vashista (24 inch diameter Plainwave). Among the back-end instruments the observatory has several CCD cameras, Lhires spectrometer and filters.

Apart from regular observations, this observatory also hosts visitors from schools and colleges who are interested in sky-watching. The students and teachers can stay overnight and observe the sky. In many occasions interns and short term visitors can do projects under the supervision of the faculty members.

Currently three students are working towards their PhD degree.

Executive Committee of ionospheric and earthquake research centre, Sitapur, Paschim Medinipur

Prof. Sandip Kumar Chakrabarti (*Chairman).*
Mr. Subrata Burai (*Vice-Chairman).*
Mr. DebashisBhowmick (*Member)*
Dr. Devendra Bish (Member)
Dr. Ashish Raj (Member, In Charge, Observatory)

Activities of the Indian Centre for Space Physics, Malda Branch

The Malda Branch of Indian Centre for Space Physics organized various types of scientific activities along with research work since its inception. It has a VLF antenna and a receiver to continue their research on VLF sources and sudden atmospheric disturbances as well as lightning and earthquake. Some students are engaged in analysis of data obtained from IXAE and RXTE. Several scientific papers on class transitions, solar flare and earthquake have been published.

Corresponding Address for Malda branch:

Dr. A.K. Chatterjee/ Mr. A. K. Choudhury/ Mr. S. Das
Indian Centre for Space Physics, Malda Branch, Atul Market, Malda, 732101.

Co-ordinating Body of the Malda Branch of the Centre

Dr. Achintya K. Chatterjee, *President*
Mr. Asit K. Choudhury, *Secretary*
Mr. Zahirul Islam, *Member*
Dr. Ankur Sensharma, *Member*
Mr. Prithwiraj Sarkar, *Member*
Mr. Nilmadhab Nandi, Member
Mr. Kankar Bandopadhyay, *Vice President*
Mr. Subhankar Das, *Treasurer*
Mr. Gobinda Chandra Mandal, *Member*
Ms. Tamali Chatterjee, *Member*
Mrs. Sutapa Chatterjee, *Member*
Mr. Utpal Chatterjee, Member

X-ray laboratory Staff members



Mr. Debashish Bhowmick
(Engineer -II and Estate Officer)



Mr. Hriday Roy
(Lab Assistant)

Office Staff



Mr. Rajkumar Maiti
(Executive Officer)



Mr Jyotisman Moitra
(Computer Assistant)



Mr. Uttam Sardar
(Office Helper)



Mr. Bivash Bhandari
(Office Helper)



Mr. Binod Singh
(Security)



Mr. Raghu Nath Pal
(Security)



Mr. Barun Chakraborty
(Night Guard)



Mr. Rehanul Haque
(Site Engr cum store in-charge)



Mr. Joydeb Shee
(Caretaker)



Mr. Santosh Das
(Caretaker)

SSKA & Associates
Chartered Accountants

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Independent Auditors' Report

To The Members of
Indian Centre for Space Physics

Report on the Audit of the Financial Statements

Opinion

We have audited the accompanying Financial Statements of **Indian Centre for Space Physics** ("the Institute"), which comprises the Balance Sheet as at 31st March, 2025, the Statement of Income and Expenditure and the Cash Flow Statement for the year then ended, and notes to the Financial Statements, including a summary of significant accounting policies and other explanatory information.

In our opinion and to the best of our information and according to the explanations given to us, the aforesaid financial statements give the information required by the Companies Act, 2013 ('the Act') in the manner so required and give a true and fair view in conformity with the accounting standards prescribed under section 133 of the Act read with Rule 3 of the Companies (Accounting Standards) Rules, 2021 (as amended from time to time) ('the AS') and other accounting principles generally accepted in India ('the Indian GAAP'), of the state of affairs of the Institute as at 31st March, 2025 and its deficit and cash flows for the year ended on that date.

Basis for Opinion

We conducted our audit of the financial statements in accordance with the Standards on Auditing (SAs) specified under Section 143 of the Act. Our responsibilities under those Standards are further described in the "***Auditors' Responsibilities for the Audit of the Financial Statements***" section of our report. We are independent of the Institutein accordance with the Code of Ethics issued by the Institute of Chartered Accountants of India together with the independence requirements that are relevant to our audit of the financial statements under the provisions of the Act and the Rules thereunder, and we have fulfilled our other ethical responsibilities in accordance with these requirements and the Code of Ethics. We believe that the audit evidences we have obtained are sufficient and appropriate to provide a basis for our opinion on the financial statements.

Key Audit Matters

Key audit matters are those matters that, in our professional judgment, were of most significance in our audit of the financial statements of the current period. These matters were addressed in the context of our audit of the financial statements as a whole, and in forming our opinion thereon, and we do not provide a separate opinion on these matters.



Jagdish Gurat

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Information Other than the Financial Statements and Auditors' Report Thereon

The Institute's Board of Directors is responsible for the preparation of the other information. The other information comprises the information included in the Board's Report including Annexure to Board's Report, but does not include the financial statements and our auditors' report thereon.

Our opinion on the financial statements does not cover the other information and we do not express any form of assurance or conclusion thereon.

In connection with our audit of the financial statements, our responsibility is to read the other information and, in doing so, consider whether the other information is materially inconsistent with the financial statements or other information obtained during the course of our audit or otherwise appears to be materially misstated.

If, based on the work we have performed, we conclude that there is a material misstatement of this other information; We are required to report that fact. We have nothing to report in this regard.

Management's Responsibility for the Financial Statements

The Institute's Board of Directors is responsible for the matters stated in section 134(5) of the Act with respect to the preparation of these financial statements that give a true and fair view of the financial position, financial performance and cash flows of the Institute in accordance with the AS and the Indian GAAP. This responsibility also includes maintenance of adequate accounting records in accordance with the provisions of the Act for safeguarding of the assets of the Institute and for preventing and detecting frauds and other irregularities; selection and application of appropriate accounting policies; making judgments and estimates that are reasonable and prudent; and design, implementation and maintenance of adequate internal financial controls, that were operating effectively for ensuring the accuracy and completeness of the accounting records, relevant to the preparation and presentation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, the Board of Directors is responsible for assessing the Institute's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless the Board of Directors either intends to liquidate the Institute or to cease operations, or has no realistic alternative but to do so.

The Board of Directors is responsible for overseeing the Institute's financial reporting process.

Auditors' Responsibility for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors' report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with SAs will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.



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As part of an audit in accordance with SAs, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal financial controls relevant to the audit in order to design audit procedures that are appropriate in the circumstances. Under section 143(3)(i) of the Act, we are also responsible for expressing our opinion on whether the Institute has adequate internal financial controls with reference to financial statements in place and the operating effectiveness of such controls.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Institute's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our Auditors' report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our Auditors' report. However, future events or conditions may cause the Institute to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

Materiality is the magnitude of misstatements in the financial statements that, individually or in aggregate, makes it probable that the economic decisions of a reasonably knowledgeable user of the financial statements may be influenced. We consider quantitative materiality and qualitative factors in (i) planning the scope of our audit work and in evaluating the results of our work; and (ii) to evaluate the effect of any identified misstatements in the financial statements.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

We also provide those charged with governance with a statement that we have complied with relevant ethical requirements regarding independence, and to communicate with them all relationships and other matters that may reasonably be thought to bear on our independence, and where applicable, related safeguards.

From the matters communicated with those charged with governance, we determine those matters that were of most significance in the audit of the financial statements of the current period and are therefore the key audit matters. We describe these matters in our Auditors' report unless law or regulation precludes public disclosure about the matter or when, in extremely rare circumstances, we determine that a matter should not be communicated in our report because the adverse consequences of doing so would reasonably be expected to outweigh the public interest benefits of such communication.



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Report on Other Legal and Regulatory Requirements

1. This being a company licensed to operate under section 8 of the Act, therefore, the matters specified in paragraph 3 and 4 of Companies (Auditors' Report) Order, 2020 ("the Order"), issued by the Central Government of India in terms of sub-section (11) of Section 143 of the Act are not required to be reported.

2. As required by Section 143(3) of the Act, based on our audit we report that:

   a) We have sought and obtained all the information and explanations which to the best of our knowledge and belief were necessary for the purpose of our audit;

   b) In our opinion, proper books of account as required by law have been kept by the Institute so far as it appears from our examination of those books;

   c) The Balance Sheet, the Statement of Income and Expenditure and the Cash Flow Statement dealt with by this report are in agreement with the books of account;

   d) In our opinion, the aforesaid financial statements comply with the Accounting Standards specified under section 133 of the Act, read with Rule 3 of the Companies (Accounting Standards) Rules, 2021;

   e) On the basis of written representations received from the directors as on 31st March, 2025 taken on record by the Board of Directors, none of the directors is disqualified as on 31st March, 2025 from being appointed as director in terms of Section 164(2) of the Act;

   f) With respect to the adequacy of the internal financial controls over financial reporting of the Institute and the operating effectiveness of such controls, refer to our separate report in "**Annexure A**"; and

   g) With respect to the other matters to be included in the Auditors' Report in accordance with Rule 11 of the Companies (Audit and Auditors) Rules, 2014, in our opinion and to the best of our information and according to the explanations given to us:

      i. The Institute does not have any pending litigations which would impact its financial positions;
      ii. The Institute did not have any long-term contracts including derivative contracts for which there were any material foreseeable losses; and
      iii. There has been no amount required to be transferred to the Investor Education and Protection Fund by the Institute;
      iv. (a) The management has represented that, to the best of their knowledge and belief, other than as disclosed in the notes to the accounts, no funds have been advanced or loaned or invested (either from borrowed funds or share premium or any other sources or kind of funds) by the company to or in any other person(s) or entity(ies), including foreign entities ("Intermediaries"), with the understanding, whether recorded in writing or otherwise, that the Intermediary shall, whether, directly or indirectly lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the company ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries;



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(b) The management has represented, that, to the best of their knowledge and belief, other than as disclosed in the notes to the accounts, no funds have been received by the company from any person(s) or entity/(ies), including foreign entities ("Funding Parties"), with the understanding, whether recorded in writing or otherwise, that the company shall, whether, directly or indirectly, lend or invest in other persons or entities identified in any manner whatsoever by or on behalf of the Funding Party ("Ultimate Beneficiaries") or provide any guarantee, security or the like on behalf of the Ultimate Beneficiaries; and

(c) Based on audit procedures that has considered reasonable and appropriate in the circumstances, nothing has come to our notice that has caused us to believe that the representations under sub-clause (a) and (b) contain any material mis-statement;

v. During the year, no dividend has been declared or paid by the Company; and

vi. Based on our examination, which included test checks, we report that the Company has used accounting software for maintaining its books of account for the financial year ended March 31, 2025 which has a feature of recording audit trail (edit log) facility and the same has operated throughout the year for all relevant transactions recorded in the software. Further, during the course of our audit we did not come across any instance of the audit trail feature being tampered with and the audit trail has been preserved by the Company as per the statutory requirements for record retention.

For SSKA & Associates
Chartered Accountants
FRN # 328751E



Jagdish Mohata

Jagdish Mohata, FCA
(Partner)
M. No. # 307910

Kolkata, the 20th day of September, 2025.
UDIN: 25307910BMGHTW5042

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Annexure - A to the Independent Auditors' Report

(Referred to in paragraph (2)(f) under '**Report on Other Legal and Regulatory Requirements**' section of our Report of even date)

Report on the Internal Financial Controls under Clause (i) of Sub-section 3 of Section 143 of the Companies Act, 2013 ("the Act")

We have audited the internal financial controls with reference to financial statements ("IFC") of **Indian Centre for Space Physics** ("the Institute") as of 31st March, 2025 in conjunction with our audit of the financial statements of the Institute for the year ended on that date.

Management's Responsibility for Internal Financial Controls

The Institute's management is responsible for establishing and maintaining internal financial controls based on the internal control over financial reporting criteria established by the Institute considering the essential components of internal control stated in the Guidance Note on Audit of Internal Financial Controls over Financial Reporting issued by the Institute of Chartered Accountants of India ('ICAI'). These responsibilities include the design, implementation and maintenance of adequate internal financial controls that were operating effectively for ensuring the orderly and efficient conduct of its business, including adherence to Institute's policies, the safeguarding of its assets, the prevention and detection of frauds and errors, the accuracy and completeness of the accounting records, and the timely preparation of reliable financial information, as required under the Act.

Auditors' Responsibility

Our responsibility is to express an opinion on the Institute's IFC based on our audit. We conducted our audit in accordance with the Guidance Note on Audit of Internal Financial Controls over Financial Reporting (the "Guidance Note") and the Standards on Auditing, issued by ICAI and deemed to be prescribed under section 143(10) of the Act, to the extent applicable to an audit of internal financial controls, both applicable to an audit of Internal Financial Controls and, both issued by the Institute of Chartered Accountants of India. Those Standards and the Guidance Note require that we comply with ethical requirements and plan and perform the audit to obtain reasonable assurance about whether adequate internal financial controls over financial reporting was established and maintained and if such controls operated effectively in all material respects.

Our audit involves performing procedures to obtain audit evidence about the adequacy of the IFC and their operating effectiveness. Our audit of IFC included obtaining an understanding of IFC with reference to these financial statements, assessing the risk that a material weakness exists, and testing and evaluating the design and operating effectiveness of internal control based on the assessed risk. The procedures selected depend on the Auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion on the Institute's IFC.



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Meaning of IFC with reference to Financial Statements

A Institute's IFC with reference to Financial Statements is a process designed to provide reasonable assurance regarding the reliability of financial reporting and the preparation of Financial Statements for external purposes in accordance with generally accepted accounting principles. AInstitute's IFC includes those policies and procedures that

(1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the Institute;

(2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the Institute are being made only in accordance with authorizations of management and directors of the Institute; and

(3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the Institute's assets that could have a material effect on the financial statements.

Inherent Limitations of Internal Financial Controls with reference to Financial Statements

Because of the inherent limitations of IFC, including the possibility of collusion or improper management override of controls, material misstatements due to error or fraud may occur and not be detected. Also, projections of any evaluation of the internal financial controls over financial reporting to future periods are subject to the risk that the IFC may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

Opinion

In our opinion, the Institute has, in all material respects, an adequate IFC and such IFC were operating effectively as at 31st March, 2025, based on the IFC criteria established by the Institute considering the essential components of internal control stated in the Guidance Note on Audit of Internal Financial Controls Over Financial Reporting" issued by the Institute of Chartered Accountants of India.

For SSKA & Associates
Chartered Accountants
FRN # 328751E



Jagdish Mohata

Jagdish Mohata, FCA
(Partner)
M. No. # 307910

Kolkata, the 20th day of September, 2025.

INDIAN CENTRE FOR SPACE PHYSICS

CIN:U73100WB1999NPL090718

Balance Sheet as at 31st March, 2025

(Amounts in INR Thousands unless otherwise Stated)

Particulars	Note	As at 31st March, 25	As at 31st March, 24
Fund and Liabilities			
Capital Fund			
Life Membership Fees	3	23.00	23.00
Reserves and Surplus	4	91,931.47	92,333.55
		91,954.47	92,356.55
Other Current Liabilities			
Current Liabilities	5	1,050.44	1,182.43
		1,050.44	1,182.43
Total		**93,004.91**	**93,538.98**
Assets			
Non-current Assets			
Property, Plant and Equipments & Intangible Assets	6		
Property, Plant and Equipments		5,301.24	6,002.80
Intangible Assets		15.40	52.09
Capital Work-in-Progress (Building)	7	86,198.13	83,634.45
		91,514.77	89,689.35
Current Assets			
Cash and Bank Balances	8	1,125.55	3,576.70
Short-term Loans and Advances	9	364.59	272.93
		1,490.14	3,849.64
Total		**93,004.91**	**93,538.98**
General Information	1		
Significant Accounting Policies	2		
Notes To Financial Statements	3-14		

As per our report of even date attached.

For and on behalf of Board of Directors

For SSKA & Associates
Chartered Accountants
FRN # 328751E

SSKA & ASSOCIATES FRN 328751E KOL-1 Chartered Accountants

Jagdish Mohata, FCA
(Partner)
M. No. # 307910
Kolkata, 20th day of September, 2025.

Sonali Chakrabarti
(Director)
DIN: 00684937
Secretary
Indian Centre For Space Physics

Sujoy Kumar Maiti
(Director)
DIN: 09229862
Treasurer
Indian Centre For Space Physics

Subrata Midya
(Director)
DIN: 07575519
Vice President
Indian Centre For Space Physics

Sandip Kumar Chakrabarti
(Director)
DIN: 00683375
Director
Indian Centre for Space Physics

INDIAN CENTRE FOR SPACE PHYSICS

CIN:U73100WB1999NPL090718

Statement of Income and Expenditure for the Year Ended 31st March, 2025

(Amounts in INR Thousands unless otherwise Stated)

PARTICULARS	Note	For the year ended 31st March, 25	For the year ended 31st March, 24
Grants and Other Incomes			
Grants Received	10	11,587.43	11,315.12
Other Income	11	1,822.80	1,295.28
		13,410.24	**12,610.40**
Expenditure			
Employee Benefits Expense	12	10,762.04	9,889.06
Depreciation & Amortisation Expenses	6	715.53	1,000.50
Other Expenses	13	2,355.27	2,251.25
		13,832.84	**13,140.81**
Tax Expense			
Current Tax		-	-
Excess of Income over Expenditure for the year		**(422.61)**	**(530.42)**
Add: Reserves Brought Forward		6,814.79	7,345.21
Reserve Carried to Balance Sheet		**6,392.19**	**6,814.79**
General Information	1		
Significant Accounting Policies	2		
Notes To Financial Statements	3-14		

As per our report of even date attached.

For and on behalf of Board of Directors

For SSKA & Associates
Chartered Accountants
FRN # 328751E

Jagdish Mohata

SSKA & ASSOCIATES FRN 328751E KOL-1 Chartered Accountants

Jagdish Mohata, FCA
(Partner)
M. No. # 307910
Kolkata, 20th day of September, 2025.

Sonali Chakrabarti

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INDIAN CENTRE FOR SPACE PHYSICS

CIN:U73100WB1999NPL090718

Cash Flow Statements for the year ended 31st March, 2025

(Amounts in INR Thousands unless otherwise Stated)

		Year Ended 31st March, 25	Year Ended 31st March, 24
A.	**Cash Flow from Operating Activities:**		
	Excess / (Short) of Income over Expenditure	(422.61)	(530.42)
	Adjustment for:		
	Depreciation	715.53	1,000.50
	Profit on sale of asset	(51.23)	-
	Operating Profit Before Working Capital Changes	241.69	470.09
	Adjustment for:		
	Current Assets	(91.66)	(46.18)
	Current Liabilities and Provisions	(131.99)	(274.09)
	Change in Working Capital	(223.65)	(320.28)
	Cash Flow From Operations	18.04	149.81
	Net Cash Generated by Operating Activities (A)	**18.04**	**149.81**
B.	**Cash Flow From Investing Activities**		
	(Purchase of Fixed Assets)	(13.05)	(462.31)
	(Sale of Fixed Assets)	87.00	-
	(Capital Advances)	(2,563.68)	(29,051.11)
	(Investment in)/Maturity of Fixed Deposits	-	15,326.46
	Cash Flow From Investing Activities (B)	**(2,489.73)**	**(14,186.97)**
C.	**Cash Flow From Financing Activities**		
	Corpus Fund Received	20.53	14,396.90
	Cash Flow From Financing Activities (C)	**20.53**	**14,396.90**
	D. Net Increase/(Decrease) in Cash and Cash Equivalents (A+B+C)	(2,451.16)	359.74
	E. Opening Balance of Cash and Cash Equivalents	3,576.70	3,216.96
	F. Closing Balance of Cash and Cash Equivalents (D+E)	**1,125.55**	**3,576.70**

Notes:

i. Cash and Cash Equivalents represents the amount as mentioned in Note 8 'Cash and Cash Equivalents'.

ii. All figures in brackets represent outflows.

As per our report of even date attached.

For SSKA & Associates

Chartered Accountants

FRN # 328751E

Jagdish Mohata

SSKA & ASSOCIATES FRN 328751E KOL-1 Chartered Accountants

Jagdish Mohata, FCA

(Partner)

M. No. # 307910

Kolkata, 20th day of September, 2025.

For and on behalf of Board of Directors

Sonali Chakrabarti

Sonali Chakrabarti
(Director)
DIN: 00684987

Secretary
Indian Centre For Space Physics

Sujoy Kumar Maiti

Sujoy Kumar Maiti
(Director)
DIN: 09229862

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DIN: 07575519

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Sandip Kumar Chakrabarti
(Director)
DIN: 00683375

Director
Indian Centre for Space Physics

INDIAN CENTRE FOR SPACE PHYSICS

CIN:U73100WB1999NPL090718

Notes to Financial Statements

1 Corporate Information

M.S. Indian Centre for Space Physics" (CIN: U73100WB1999NPL090718), is a public limited company ("Limited by Guarantee") licensed to operate under section under section 8 of the Companies Act, 2013 (originally known as under section 25 of the Companies Act, 1956) as "Not for Profit Company" and is presently engaged in development and research projects related to Space and Physics at its premises at 466, Barakhola, Nitai Nagar, Kolkata - 700 099.

2 Significant Accounting Policies

a. Basis of Accounting and Preparation of Financial Statements

The Financial Statements have been prepared on accrual basis under the historical cost convention. The accounting policies adopted in the preparation of the financial statements are consistent with those followed in the previous year. The financial statements have been prepared to comply in all material respects with the mandatory Accounting Standards (AS) notified under section 133 of the Companies Act, 2013 ('the Act') read with Rule 3 of the Companies (Accounting Standards) Rules, 2021 and the provisions of the Act (to the extent notified). The financial statements have been prepared under the historical cost convention on an accrual basis. The Accounting Policies have been consistently applied by the Company.

b. Use of Estimates

The preparation of financial statements in conformity with generally accepted accounting principles requires the management to make judgements, estimates and assumptions that affect the reported amounts of revenues, expenses, assets and liabilities and disclosure of contingent liabilities at the date of financial statements and the results of operations during the reporting year end. Although these estimates are based upon the management's best knowledge of current events and actions, uncertainty about these assumptions and estimates could result in the outcomes requiring a material adjustment to the carrying amount of assets and liabilities in future periods.

c. Property, Plant and Equipments

Property, Plant & Equipment have been valued at cost less accumulated depreciation and impairments, if any. Fixed Assets have been stated at cost inclusive of incidental expenses incurred in connection with the acquisition / installation thereof.

d. Depreciation & Amortisation

Depreciation on Property, Plant & Equipments have been provided to the extent of depreciable amount on straight line method on pro-rata basis based on the useful life of the assets prescribed in Schedule II to the Companies Act, 2013.

Amortisation on Intangible Assets have been provided to the extent of depreciable amount on written down value method on pro-rata basis based on the useful life of the asset over a period of 10 years.

e. Cash Flow Statements

Cash Flows are reported using the Indirect Method as set out in Accounting Standard - 3 : Cash Flow Statement, whereby profit before tax is adjusted for the effects of transactions of a non-cash nature, any deferrals or accruals of past or future operating cash receipts or payments and item of income or expenses associated with investing or financing flows. The Cash Flows from Operating, Investing and Financing activities of the Company are segregated based on the available information.

f. Employees Benefits

As per provision laid out in Rules and By Laws approved by the Governing Body, it has several academic and non-academic staff members. Regular members enjoy benefits of structured salary with DA as decided by the Governing Body and benefits of National Pension System (NPS) if funds permit. Semi-regulars, i.e., contractual workers with possible yearly renewals enjoy annual salary increment but not structured salary. The rests are strictly taken on temporary basis till the requirement lasts. Being an Autonomous Body, the Governing Body decides the career advancement policy for the regular members. The provisions of Employees Provident Fund (EPF) are not applicable to the Company as they have less than twenty Staff members. This supersedes all earlier notes under this head.

g. Earning per Share

The Company is a Section 8 "Not for Profit Company". It does not generate any income/revenue from its activities and is also limited by Guarantee. Therefore, the provisions of AS-20 are not applicable.

h. Classifications of Current and Non Current Assets and Liabilities

The Company presents assets and liabilities in the Balance sheet based on current and non-current classification. An asset is treated as current when it is held primarily for the purpose of trading and is expected to be realised or intended to be sold in company's normal operating cycle. All other assets other than current are non-current assets. A liability is treated as current when it is held primarily for the purpose of trading and is expected to be settled or in company's normal operating cycle. All other liabilities other than current are non-current liabilities.

Treasurer
Indian Centre For Space Physics

Secretary
Indian Centre For Space Physics

Director
Indian Centre for Space Physics

Vice President
Indian Centre For Space Physics

INDIAN CENTRE FOR SPACE PHYSICS

CIN:U73100WB1999NPL090718

Notes to Financial Statements

i. Revenue Recognition

All items of Statement of Profit and Loss are accounted for on accrual basis.

j. Borrowing Costs

Interest and other costs in connection with the borrowing of funds to the extent related to the acquisition of qualifying fixed assets are capitalised upto the date when such assets are ready for their intended use.

k. Earnings Per Share

The Basic Earnings Per Share is computed by dividing the net profit attributable to equity shareholders for the year, by the weighted average number of equity shares outstanding at the end of the year.

l. Taxes on Income

Provision for current tax is made after taking into consideration various benefits and allowance admissible under the provisions of the Income Tax Act, 1961, read with Income Tax Rule 1962.

Deferred Tax resulting from "timing difference" between book and taxable profits is accounted for using the tax rate and law that have been substantively enacted as on the Balance Sheet date to the extent the timing differences are expected to be crystallised. Deferred Tax Asset are recognised and reviewed at each Balance Sheet date to the extent their is reasonable / virtual certainty of realising such asset against future taxable income.

m. Provisions and Contingent Liabilities

The Company creates provision when there is present obligation as a result of a past event that probably requires an outflow of resources and a reliable estimate can be made of the amount of the obligation. A disclosure for a contingent liability is made when there is a possible obligation that may, but probably will not, require an outflow of resources. When there is a possible obligation or a present obligation in respect of which the likelihood of outflow of resources is remote, no provision or disclosure is made.

n. Specific Grants

The Institution receives specific earmarked grants from Government of West Bengal through MPLADS Scheme for implementation for various infrastructural projects in West Bengal. The Institution is registered under section 12A/12AA of the Income-tax Act, 1961.

The Institution is in receipt of general purpose fund and specific purpose fund from the Government of West Bengal as well as various Other Agencies. The general purpose fund, which was granted to the assessed primarily for funding the administrative expense such as payment of salary, bonus etc., was duly credited to the Income & Expenditure Account. The specific purpose fund such as fund granted to the Institution for construction of Campus building etc. was directly taken to the Balance Sheet as it constituted capital/corpus of the Trust.

The Institution has used the aforesaid specific grants for the specific purposes only and further that the unused grants will be paid back/refunded to the Government or if any shortfall for such projects , the same will be received from the Government. The Institution is only an executing agency of the Infrastructural projects. The Institution was not authorized to use these funds for any other purposes other than Specific Purpose and has maintained a separate earmarked bank account. The Income received on fixed deposits, if any also added to such funds and will be used for the specific purposes for which grants received and will not form part of the Income of the Institution.

SSKA & ASSOCIATES PRN 328751E KOL-1 Chartered Accountants

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Note to Financial Statements

Note-6

Property, Plant and Equipments

(Amounts in INR Thousands unless otherwise Stated)

Previous Year

Particulars	Gross Block				Depreciation				Net Block
	As on 01.04.23	Addition during the year	Sale during the year	As on 31.03.24	As on 01.04.23	During the year	Adjusted on deletion	As on 31.03.24	As on 31.03.24
Tangible									
Computers & Accessories	2,984.90	13.10	-	2,997.99	2,841.83	142.03	-	2,983.87	14.13
Furniture	182.01	449.22	-	631.23	161.14	24.55	-	185.69	445.54
Office Equipment	265.59	-	-	265.59	252.31	1.99	-	254.31	11.29
Scientific Equipment	5,430.73	-	-	5,430.73	5,159.19	40.73	-	5,199.92	230.81
Telescope	5,739.22	-		5,739.22	2,180.90	533.75		2,714.65	3,024.57
Boundary Wall	1,338.02	-	-	1,338.02	442.93	192.76	-	635.69	702.33
Land * #	1,096.00	-	-	1,096.00	-	-	-	-	1,096.00
Land Developments	308.38	-	-	308.38	-	-	-	-	308.38
Car	360.29	-	-	360.29	314.80	6.82	-	321.62	38.67
Books	76.05	-	-	76.05	76.05	-	-	76.05	-
Machineries	165.89	-	-	165.89	52.36	17.03		69.39	96.50
Refrigerator	20.99	-		20.99	3.72	2.59		6.31	14.68
Electrical Items	468.74	-	-	468.74	445.30	3.52	-	448.82	19.92
Previous Year	**18,436.80**	**462.31**	-	**18,899.11**	**11,930.54**	**965.77**	-	**12,896.31**	**6,002.80**
Intangible									
Software	308.01	-	-	308.01	221.19	34.73	-	255.92	52.09
Previous Year	**308.01**	-	-	**308.01**	**221.19**	**34.73**	-	**255.92**	**52.09**
Previous Year Total	**18,744.81**	**462.31**	-	**19,207.13**	**12,151.73**	**1,000.50**	-	**13,152.23**	**6,054.89**

* On lease from Govt. of West Bengal (Approx. Area 0.41 acres in Kolkata).
*The Title Deeds of the Land are held in name of the Company.

0.25 acres from private donation.

Soneli Chakraborty
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Note to Financial Statements

Note-6

Property, Plant and Equipments

(Amounts in INR Thousands unless otherwise Stated)

Current Year

Particulars	Gross Block				Depreciation				Net Block
	As on 01.04.24	Addition during the year	Sale during the year	As on 31.03.25	As on 01.04.24	During the year	Adjusted on deletion	As on 31.03.25	As on 31.03.25
Tangible									
Computers & Accessories	2,997.99	-	-	2,997.99	2,983.87	-	-	2,983.87	14.13
Furniture	631.23	-	-	631.23	185.69	48.25	-	233.94	397.29
Office Equipment	265.59	-	-	265.59	254.31	-	-	254.31	11.29
Scientific Equipment	5,430.73	13.05	-	5,443.78	5,199.92	1.17	-	5,201.09	242.69
Telescope	5,739.22	-		5,739.22	2,714.65	545.23		3,259.87	2,479.34
Boundary Wall	1,338.02	-	-	1,338.02	635.69	42.37	-	678.06	659.96
Land	1,096.00	-	-	1,096.00	-	-	-	-	1,096.00
Land Developments * #	308.38	-	-	308.38	-	-	-	-	308.38
Car	360.29	-	360.29	-	321.62	2.90	(324.52)	-	-
Books	76.05	-	-	76.05	76.05	-	-	76.05	-
Machineries	165.89	-	-	165.89	69.39	31.52		100.91	64.98
Refrigertaor	20.99	-		20.99	6.31	3.99		10.30	10.69
Electrical Items	468.74	-	-	468.74	448.82	3.42	-	452.24	16.50
Current Year	**18,899.11**	**13.05**	**360.29**	**18,551.87**	**12,896.31**	**678.84**	**(324.52)**	**13,250.62**	**5,301.24**
Intangible									
Software	308.01	-	-	308.01	255.92	36.69	-	292.61	15.40
Current Year	**308.01**	**-**	**-**	**308.01**	**255.92**	**36.69**	**-**	**292.61**	**15.40**
Current Year Total	**19,207.13**	**13.05**	**720.59**	**18,859.88**	**13,152.23**	**715.53**	**(324.52)**	**13,543.24**	**5,316.64**

* On lease from Govt. of West Bengal (Approx. Area 0.41 acres in Kolkata).

*The Title Deeds of the Land are held in name of the Company.

0.25 acres from private donation.

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INDIAN CENTRE FOR SPACE PHYSICS
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Notes to Financial Statements

(Amounts in INR Thousands unless otherwise Stated)

Particulars	For the year ended 31st March, 25	For the year ended 31st March, 24
Note-3		
Life Membership Fees		
Life Membership Fees	23.00	23.00
[`500/- for Forty Six members]		
	23.00	**23.00**
Note-4		
Reserves and Surplus		
Surplus	6,392.19	6,814.79
Corpus Fund	5,471.76	5,471.76
(For purchase of Asset with Specific Direction)		
Building Fund	74,400.26	60,003.36
Add: Interest on Fixed Deposits Received	20.53	396.90
Add: Grant Received during the Year	-	14,000.00
	74,420.79	74,400.26
Fund For Specific Purpose	5,646.74	5,646.74
	91,931.47	**92,333.55**
Note-5		
Current Liabilities		
Unutilised Grants	1,026.94	1,137.18
Liabilities for Expenses	23.50	45.25
	1,050.44	**1,182.43**

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(Amounts in INR Thousands unless otherwise Stated)

Particulars	For the year ended 31st March, 25	For the year ended 31st March, 24
Note-7		
Capital Work-in-progress		
Project- 1 (Kolkata)		
Opening Balance	81,864.37	53,412.04
Addition during the Year	2,279.95	28,452.33
Closing Balance	84,144.32	81,864.37
Project- 2 (Sitapur)		
Opening Balance	1,770.08	1,171.31
Addition during the Year	283.73	598.78
Closing Balance	2,053.81	1,770.08
Total	**86,198.13**	**83,634.45**

Sub notes

The Institute does not receive completion certificate from the competent authority yet.

Capital Ageing schedule for the year *

CWIP	Amount in CWIP for a period of				Total *
	Less than 1 year	1-2 years	2-3 years	More than 3 years	
Projects in progress	2,563.68	29,051.11	54,583.34	-	86,198.13
	(29,051.11)	(54,583.34)	-	-	(83,634.45)

*** Figures in brackets represents previous year**

Note-8					
Cash & Bank Balances					
Cash & Cash Equivalents					
Cash in hand	28.29		16.17		
Balance with Current Account					
Axis Bank Ltd.(CA-911020006304068)	904.96		9.19		
Balance with Savings Account					
Axis Bank SEBR (919010056932777)	76.29	-	215.79		
Bandhan Bank Ltd.	12.17		1,004.75		
Union Bank of India (45839)	15.70		14.96		
Union Bank of India (46613)	9.15		2,251.60		
Union Bank of India (45840)	2.30		2.16		
Union Bank of India (46028)	2.65		2.52		
Union Bank of India (Museum)	38.75		20.30		
Central Co-operative Bank Ltd.	35.30	1,125.55	39.26		3,576.70
		1,125.55			**3,576.70**
Note-9					
Short-term Loans and Advances					
Advance to Employees		300.90			0.20
Balances with Revenue Authorities		-			120.52
Grant Receivables		63.69			152.21
		364.59			**272.93**

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INDIAN CENTRE FOR SPACE PHYSICS
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Notes to Financial Statements

(Amounts in INR Thousands unless otherwise Stated)

Particulars	For the year ended 31st March, 25	For the year ended 31st March, 24
Note-10		
Grant and Donation Received		
Grant-in-Aid	11,587.43	11,315.12
	11,587.43	**11,315.12**
Details of Grants Received and Donation Particulars		
West Bengal Government		
Donation	9,900.00	9,911.94
SERB	379.93	2,540.36
For Conference	857.51	-
	450.00	
Less: Unutilised grants	-	(1,137.18)
	11,587.43	**11,315.12**
Note-11		
Other Income		
Guest House Rent	547.60	524.57
Interest on Fixed Deposits	12.59	66.71
Interest on Bank Accounts	69.20	102.31
Interest on IT Refund	7.04	-
Registration and Others Fees	757.14	59.48
Miscellaneous Income	179.65	379.73
Income from Selling Instruments	42.65	7.00
Income from Selling Tickets, etc.	155.70	155.50
Gain on sale of a asset	51.23	-
	1,822.80	**1,295.28**
Note-12		
Employee Benefits Expense		
Salaries & Stipend	10,762.04	9,889.06
	10,762.04	**9,889.06**
Note-13		
Other Expenses		
Fund draw for Project Expenses	857.51	3.85
Conference Expense	-	287.97
Office Expenses	532.46	1,041.82
Auditors' Remuneration	44.37	36.58
Postage	0.30	0.93
Printing and Stationery	42.44	113.89
Travelling & Conveyance	65.91	18.07
Telephone, Fax & Internet	46.55	31.80
Professional Fees	10.25	3.35
Electricity Charges	324.18	233.62
Repairing Charges	3.70	6.12
Labour Charges	194.38	168.40
Loading and Unloading Charges	-	36.03
Bank Charges	0.20	4.56
Power and Fuel	14.82	18.74
Miscellaneous Expenses	100.99	88.88
Fooding Expense Office	65.44	104.84
Software Expenses	22.00	-
General Expenses	29.78	51.81
	2,355.27	**2,251.25**

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Notes to Financial Statements

Note 14

Additional Information to Financial Statements

a. Related Party Disclosures as per AS 18

List of Related Parties

Key Management Personnel

Name	Designation
Sonali Chakrabarti	Director
Sandip Chakrabarti	Director

Relative of KMP

	Relationship
Sandip Chakrabarti	Husband of director

Transaction with Related parties		31-03-2025	31-03-2024
Salary	KMP	1,815.48	1,650.44

b Specific Grants

The Institution receives specific earmarked grants from Government of West Bengal through MPLADS Scheme for implementation for various infrastructural projects in West Bengal. The Institution is registered under section 12A/12AA of the Income-tax Act, 1961.

The Institution is in receipt of general-purpose fund and specific purpose fund from the Government of West Bengal as well as various Other Agencies. The general-purpose fund, which was granted to the assessee primarily for funding the administrative expense such as payment of salary, bonus etc., was duly credited to the Income & Expenditure Account. The specific purpose fund such as fund granted to the Institution for construction of Campus building etc. was directly taken to the Balance Sheet as it constituted capital/corpus of the Trust.

The Institution has used the aforesaid specific grants for the specific purposes only and further that the unused grants will be paid back/refunded to the Government or if any shortfall for such projects, the same will be received from the Government. The Institution is only an executing agency of the Infrastructural Projects. The Institution was not authorised to use these funds for any other purposes other than the Specific purpose and has maintained a separate earmarked bank account. The Income received on fixed deposits, if any also added to such funds and will be used for the specific purposes for which grants received and will not form part of the Income of the Institution.

	31-03-2025	31-03-2024
Specific grant received during the year	-	14,000.00
Interest earned on such grant through Fixed Deposits - being used for specific purpose	20.53	396.90

c. Ratios

Ratios are not reported as the Company is a section 8 Company and a non-profit organisation.

d. Capital Commitments

i. Estimated amount of contracts remaining to be executed- not determinable as the specific project expensed as per the specific grant received from Government by us as implementing agency.

e. Additional Regulatory Requirement

i The Company does not have any charge yet to be registered or satisfied with ROC during the year.

ii No Proceeding have been initiated or pending against the Company for holding any benami property under the Benami Transactions (Prohibition) Act, 1988 and the Rules made thereunder.

iii The Company has not borrowed any borrowings against security of current assets.

iv The Company has not borrowed any funds from banks / Financial Institutions (being current assets as collateral security) during the year.

v The Company has not entered into any transactions with Company whose name have been struck off by Registrar of Companies .

vi Based on the information/documents available, none of the creditors is covered under Micro, Small and Medium Enterprise Development Act, 2006. As a result, no interest provision/payments have been made by the Company to such creditors, if any, and therefore, no disclosures are made in these accounts.

vii No loans or advances in the nature of loans have been granted to promoters, directors, KMPs and the related parties (as defined under the Companies Act, 2013) either severally or jointly with any other person.

f. Previous Year's Figures

Previous year's figures have been regrouped / reclassified wherever necessary to correspond with the current year's classification / disclosure.

SKA ASSOCIATES FRN 328751E KOL-1 Chartered Accountants

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